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DEPARTMENT OF ECOLOGY

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M E M O R A N D U M

December 19, 1986

TO: Bob Kievit, PA/SI PO
US EPA, Region X, WOO

THROUGH: Emily Ray *ER*

FROM: Michael J. Spencer *mjs*

SUBJECT: Weyerhaeuser Chlor-Alkali Plant
Site Inspection Report

Attached is the Phase I Site Inspection Report for the (former) Weyerhaeuser Chlor-Alkali Plant in Longview, Washington, with my recommendations for further actions.

MJS/drm
Attachment

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PHASE I SITE INSPECTION REPORT

WEYERHAEUSER CHLOR-ALKALI PLANT
LONGVIEW, COWLITZ COUNTY, WASHINGTON

WAD009041450

November 1986

Report Prepared by:

Michael J. Spencer
Washington State Department of Ecology
Preliminary Assessment/Site Inspection Section
Hazardous Waste Cleanup Program

SITE NAME/ADDRESS

Weyerhaeuser Chlor-Alkali Plant
3000 Industrial Way
Longview, Cowlitz County, WA 98632

INVESTIGATION PARTICIPANTS

Michael J. Spencer	Washington State Dept. of Ecology Hazardous Waste Cleanup Program (206) 459-6516
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PRINCIPAL SITE CONTACT

Ken Johnson	Weyerhaeuser Company, Longview (206) 425-2150
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DATE OF PHASE I INSPECTION

September 30, 1986

INTRODUCTION

The Weyerhaeuser chlor-alkali plant site, Longview, Washington (hereinafter referred to as site), has been identified by the U.S. Environmental Protection Agency (EPA) Region X and the Washington State Department of Ecology (Ecology) as requiring additional information to accurately profile the nature and extent of past waste disposal activities.

The Potential Hazardous Waste Site Preliminary Assessment (PA) of January 22, 1985 recommended that a site inspection (SI) be performed to determine the extent, if any, of mercury and zinc contamination of soils, ground water, river sediments, and resident fish. The subsequent inspection, carried out under the Superfund Multi-Site Cooperative Agreement PA/SI Program, is described in this report, along with further recommendations, under the following sections:

- 1.0 Site Owner/Operator
- 2.0 Site History and Background
- 3.0 Environmental Setting
 - 3.1 Climate
 - 3.2 Geology/Hydrology
 - 3.3 Topography and Drainage
 - 3.4 Ground Water and Surface Water Uses
- 4.0 Ecology Site Inspection
- 5.0 Results and Discussion
- 6.0 Conclusions and Recommendations
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 - Appendix A: Correspondence/Historical Data
 - Appendix B: EPA Site Inspection Report Form
 - Appendix C: Photographic Documentation

1.0 SITE OWNER/OPERATOR

The site of the former chlor-alkali plant is owned by Weyerhaeuser Company, whose corporate headquarters are in Tacoma, Washington.

2.0 SITE HISTORY AND BACKGROUND

Weyerhaeuser constructed a chlor-alkali plant in Longview in 1956 to produce chlorine gas and caustic soda for its adjacent pulp mill. The economics of the time favored the mercury, as opposed to the diaphragm, cell process in that less energy was consumed and a purer caustic was produced. It was the utilization of this process, until May 1975, which produced mercury-contaminated wastes, the disposal of which ultimately resulting in this Phase I site inspection (SI).

The manufacture of chlorine and caustic sodas by this "mercury" process first involved converting raw salt to a hot saturated solution. The brine was treated, clarified, and filtered to remove impurities. The pure brine was then conveyed to electrolytic mercury cells where the electric current from graphite anodes to the mercury cathodes broke down the salt into its component elements of sodium and chlorine. The chlorine gas deposited to the anode and was taken from the cell. It was processed by removing water vapors and liquefied for storage or use.

The amalgamated mercury and sodium moved from the cell to a decomposer where water was introduced. Sodium combined with hydrogen and oxygen from the water to form sodium hydroxide, commonly called caustic soda. The surplus hydrogen element was drawn off for other purposes or disposal. The mercury was returned to the cells for reuse. Caustic soda as a 50 percent solution was filtered and stored for use or shipment. Pollution could occur if mercury escaped as a gas into the atmosphere, in sludge from the brine clarifier or in effluent water.

These release mechanisms can be further described:

1. Evaporation of the mercury may occur into air or other gases. A relatively large amount vaporizes into the hydrogen generated in the cell decomposers and can be recovered by cooling the gas to a low temperature with refrigerated water, thereby condensing the mercury. Water also condenses in this process. Since separation is poorly achieved, the two are returned together to the cell system. Very small entrained mercury particles may stay in the gas stream.
2. The brine which circulates through the cells can become highly contaminated with mercury. After leaving the cell, the depleted brine is directed to a central salt dissolver for reconstitution. Chemicals are then added to precipitate impurities and facilitate settling. These impurities are then removed in a clarifier. The sludge can contain significant amounts of mercury, both in the solid and liquid fraction. After washing to remove further brine, the sludge is removed for eventual disposal.

3. Solution and/or entrainment in water or brines. Water used to cover mercury to control evaporation carries mercury with it. Dilute brine leaving the cell also carries mercury with it. Since both the flow and the brine system are large, and several different chemical and physical conditions exist therein, there is an opportunity for considerable quantities of mercury to accumulate in the process equipment.

The Weyerhaeuser Co. facilities at Longview consisted of two main cell rooms. The first cell room was built in 1956-58 and contained 126 DeNora chlorine cells each containing 45 flasks (3,420 lbs.) of mercury. The second cell room was placed on line in 1967. It contained 16 larger DeNora cells each containing 120 flasks (9,100 lbs.) of mercury.

A single salt handling and brine preparation department served both cell rooms. A salt dock and storage area received shipments of approximately 11,000 tons of raw salt on a regular basis from self-unloading water carriers. Salt was conveyed from the dock to the dissolvers and there made into brine. Brine then flowed through six reactors in series, where impurities were precipitated and flocculated. Sedimentation in three large clarifiers and filtration in automatic back wash sand filters completed brine purification.

Brine sludge, the precipitated impurities, was formerly washed and discharged to the Columbia River. In April 1970 the system was closed and land storage was substituted.

The ponds used to hold the sludge, and other waste streams as indicated above, were very hastily built installations, having been scooped out of sandy river deposits adjacent to the plants (1). Observations of changes in water marks on the sides of the ponds indicated a fairly rapid rate of seepage into the sand (*ibid.*). Adjacent to the sludge pond there was a drainage ditch leading straight to the river. During an August 1970 inspection by Ecology, there was visible evidence of recent drainage through the sludge pond dike into the ditch (Appendix A).

Plant personnel at that time indicated that no monitoring had been done of mercury concentrations in the ground water in the vicinity of the ponds. They said there is a natural rock dike between the ponds and the river and that chances of seepage into the river were minimal.

On August 24, 1970, Ecology issued Weyerhaeuser a Notice of Violation which read in part:

Notice is hereby given, in accordance with RCW 90.48.120 as follows:

1. That the Weyerhaeuser Company Chlorine-Caustic Plant, located in Longview, Washington has been and is discharging industrial wastes into the Columbia River, a public water of this state, and that said industrial wastes contain mercury in significant concentrations that are or may be detrimental to the public health.

2. That it is the determination of this agency that the Weyerhaeuser Company will take necessary action to reduce the concentration of mercury discharged into the Columbia River from the Chlorine-Caustic Plant and that said mercury concentrations will be reduced to a limit of 0.05 parts per million (ppm) or less not later than September 1, 1970.

3. That it is the determination of this agency that the Weyerhaeuser Company will take action to either totally eliminate the discharge of mercury from the Chlorine-Caustic Plant, or will show cause before this agency not later than October 1, 1970, as to why all discharges of mercury should not be prohibited by this agency.

This notice was issued in conjunction with concurrent investigations and legal actions filed by the U.S. Department of Justice. The outcome of all this was Weyerhaeuser's decision to proceed with conversion from the chlor-alkali to the diaphragm cell process. The chronology of events covering the period of this conversion, and leading up to the currently reported site inspection, is as follows:

July 24, 1970

The United States Justice Department authorized ten mercury pollution suits, Weyerhaeuser included.

July 27, 1970

Meeting held at U.S. Attorney's office, Seattle, with representatives of Ecology, FDA, Regional Solicitor's Office, Department of the Interior, Weyerhaeuser Co., and Georgia-Pacific Co. U.S. Attorney Stan Pitkin requested that a resume of past mercury activities concerning the Weyerhaeuser and Georgia-Pacific chlor-alkali operations be provided to him by each participant by the end of that week.

July 29, 1970

The U.S. Justice Department filed suit against Weyerhaeuser in the U.S. District Court in Tacoma. The suit was a civil action to enjoin Weyerhaeuser from discharging mercury or mercury compounds into the Columbia River in violation of Section 13 of the Rivers and Harbors Act of 1899 (30 Stat. 1152, 33 U.S.C. Sec. 407). The Department declined to seek criminal penalties available under the act. The Department also declined to proceed under the Federal Water Pollution Control Act which under Section 10(c)(5) together with Section 10(g)(1) probably provides for direct federal enforcement action in this case.

October 15, 1970

U.S. Department of Justice and Weyerhaeuser agreed to a stipulation (No. 4142) in U.S. District Court to continue an injunction filed by the Department of Justice, and that Weyerhaeuser should continue to meet a 0.5 lb/day mercury discharge limitation. Also that Weyerhaeuser would propose a schedule for further reductions by 12/4/70.

November 27, 1972

Letter from Region X, EPA to Weyerhaeuser said the above stipulation still was not finalized due to uncertainty over what standard to apply.

March 1973

Ecology received from EPA interim authorization to issue NPDES permits under 1972 FWPCA.

March 16, 1973

Ecology issued NPDES permit No. 3450 which would expire 12/31/75. The permit required:

interim limits: Mercury \leq 0.2 lb/day
monthly average

Mercury max. conc. \leq .05 mg/l

After Jan. 1. 1976: Mercury \leq 0.1 lb/day
monthly average

Mercury max. conc. \leq .05 mg/l

Eng. report by 9/30/74
Plans & specs by 3/1/75
In operation by 1/1/76

1973 (sometime in the year)

Weyerhaeuser wrote an EIS for conversion from mercury cell process to diaphragm cell process, and stated that "OSHA standards necessitate high air flows for ventilation. Treating these large air volumes in any way to try to meet other agencies requirements (for mercury) is extremely difficult. These incompatibilities or trade-offs strongly influenced the company's decision to convert the plant to a nonmercury operation."

July 5, 1973

EPA grants a "waiver of compliance" with mercury standard of the national emission standards for hazardous air pollutants for Weyerhaeuser's Longview facility. The consent order requires conversion or shutdown of the mercury-based chlor-alkali production process by 3/31/75.

July 1973 to May 1975

Construction underway on the conversion.

February 26, 1975

Ecology issues a new NPDES Permit, No. WA-003767-2, expiring 12/31/79.

Interim limits: same as previous permit,
after 1/76: mercury \leq 0.002 mg/l daily max. concentration.

May 3, 1975

Weyerhaeuser completed conversion of plant to diaphragm process, shutdown of mercury-based chlor-alkali production process.

April 9, 1976

Weyerhaeuser commits to Ecology that all mercury-contaminated solid wastes stored on the plant site will be disposed of at Chem-Nuclear's hazardous waste disposal site at Arlington, Oregon.

November 10, 1976

Ecology revised NPDES permit to change the date for completion of hauling the mercury contaminated sludge to Arlington, Oregon from 1/1/76 to 3/1/77.

May 1976-April 1977

Disposal of 24,012 + tons of mercury contaminated solid wastes at Chem-Nuclear, Arlington, Oregon.

June 17, 1982

Weyerhaeuser files EPA Notification of Hazardous Waste Site form, indicating a suspected release to the environment from on-site burial of an estimated 2,000 cubic yards of waste materials having a "very slight" mercury contamination.

January 22, 1985

Preliminary assessment of site by Ecology recommends a complete sampling analysis of soils, ground water, river sediments and resident fish for mercury and zinc contamination.

3.0 ENVIRONMENTAL SETTING

The Weyerhaeuser chlor-alkali plant is located on the north bank of the Columbia River, immediately west of Mt. Coffin landmark at River Mile 64, at latitude 46°07'46" and longitude 122°59'24". This location is in Section 31, Township 8 North, Range 2 West, Willamette Meridian (2). The facility is part of the Weyerhaeuser sawmill and pulp mill complex along Industrial Way.

3.1 Climate

Longview has a marine-type climate: summers are cool and dry, winters are mild but wet and cloudy; mean annual precipitation is 45 inches (3). About 75 percent of the rainfall occurs October-March. Longview has a 30-year mean temperature of 51.3°F, with a range of extremes from -20°F to 103°F (ibid.).

3.2 Geology/Hydrology

The geology of Cowlitz County closely controls the availability and chemical composition of the ground water. All the ground water comes from precipitation that has infiltrated the ground surface and then percolated downward through the openings in the rock materials. The rate of movement and availability of the ground water is controlled by the size and degree of inter-connection of these openings. The chemical character of the ground water is largely controlled by the composition of the rocks and the rate of movement of the ground water through them.

Three formations of sedimentary and volcanic rocks of the Eocene Age are present in Cowlitz County, but are not an important aquifer because of their poor water-bearing characteristics, as are volcanic rocks of the Miocene Age (4).

The Troutdale formation aquifer, extensive and very productive in Clark County to the south, is of relatively small extent in Cowlitz County and its topographic position limits its usefulness as an important aquifer source.

The lower reaches of all the major stream valleys in Cowlitz County are partly filled with alluvium, which in general consists of gravel, sand, and silt and includes deposits in alluvial fans, floodplains, deltas, and terraces. The alluvium ranges in thickness from less than 10 feet in the uplands and small valleys to more than 300 feet near the mouth of the Cowlitz River, just to the north of site.

The alluvial materials are the most productive sources of ground water in Cowlitz County and are tapped by the most wells (ibid.). They are very permeable in most places but permeability decreases as the amount of clay and silt in them increases. Yields of wells tapping these materials are as great as 3,000 gpm, and drawdowns of the water level in pumping wells generally are no more than about 40 feet.

Ground water in the county occurs under both unconfined and confined conditions. Most of the alluvial aquifers contain unconfined ground water in their upper parts, but confinement often occurs and increases with depth. Nearly all the water obtained from the older rock units is confined to some degree--in most cases ground water found in these rocks rises above the depths where first encountered during drilling (5).

Well logs for the two production wells on-site show fill and sandy clay down to about 30-36 feet, with grey clay on down to about 180 feet, and coarse gravel/sand from there to 202 feet (hardpan). Static water level has been measured at 20 feet, although the wells are cased down to 172-183 feet and screened from there down to hardpan. This reflects the confining nature of the production aquifer for these two wells.

There is an indication of a shallow water table at 11 foot depth (6).

The direction of ground water flow would be expected to be to the southwest (towards the Columbia River), however, for production wells quite near to the river, heavy pumping can induce recharge from the river, with transient reversal in the direction of flow. River stage height may also affect ground water flow and recharge, although the degree of these effects upon the deeper, more confined aquifer tapped on-site is unknown.

Ground water recharge in the county is primarily from direct infiltration of water from precipitation, with most of the discharge occurring through seepage to stream channels and evapotranspiration for the shallow water table aquifers, and by large quantity production wells for the deeper aquifers (3).

3.3. Topography and Drainage

The site is flat, having been leveled out through years of development (filling). There is a slight drop off to the Columbia River at the southwest edge of the property. Surface runoff, not collected by any on-site sumps, would drain in this direction. The process wastewater has been discharged through the pulp mill pipeline to the Columbia River under an NPDES permit since 1980. Prior to that date it was discharged out its own separate outfall.

3.4 Ground Water and Surface Water Uses

There are two 200-foot deep ground water production wells on-site for industrial use, the facility drinking water coming from Longview's municipal water supply system, three miles (upgradient) to the north (6). Surface water in vicinity is not used for drinking, however it is an important recreational and fisheries resource.

4.0 ECOLOGY SITE INSPECTION

A PA/SI site inspection (SI) was conducted at the facility during the morning of September 30, 1986. In attendance for Weyerhaeuser were: Bob Anderson and Jim Fisher, Tacoma Office, and Don Work, Longview. (See also M.J. Spencer Memo to file, Appendix A).

The initial 1.5 hours was spent going over Weyerhaeuser's report "Assessment of the Environmental Effects of Residual Mercury near the Longview Chlor-Alkali Plant," prepared by Jim Fisher and previously submitted to Ecology July 16, 1986. The report detailed the methods and results of a comprehensive sampling program carried out by Mr. Fisher February 18-20, 1986. The objective was to determine whether residual mercury could be detected in samples of soils, ground water, surface water, process water, river sediments, and aquatic (fish) organisms in the vicinity of the former mercury-cell chlorine plant at Longview. This was in response to the follow-up recommendations in the PA submitted to Weyerhaeuser by Ecology in December 1985.

As background, Mr. Anderson and Mr. Fisher described the events leading up to conversion, in mid-1975, from the mercury-based chlor-alkali production process to the diaphragm cell technology (this is presented in greater detail in Section 2.0) and how this related to the findings of the PA.

The PA stated that mercury-laden wastes were discharged to the Columbia River between 1956-1970, when they were then stored as sludges in unlined ponds on-site. Under the conditions of their NPDES permit, Weyerhaeuser reduced mercury effluent discharges for the river from around 10-15 pounds to 0.2 pounds per day, prior to the conversion period (7). The bulk of this was recovered and recycled through technological improvements in the recovery/recycling processes, however, losses were still occurring into soils and vaporization into the air, with its own environmental standards to be met.

It became evident to Weyerhaeuser that the most economically feasible alternative was to proceed with conversion to the non-mercury-based diaphragm cell process, this occurring by May, 1975.

Dismantling of the former facility occurred during the conversion period of 1973-1975 and for some time afterward, resulting in approximately 24,000 tons of mercury-contaminated solid wastes being transported to Chem-Nuclear, Arlington, Oregon. The bulk of this was removed from the areas around the former brine ponds along the eastern side of the cell room (Figure 1).

According to the May 4, 1982 CERCLA 103(c) (Notification of Hazardous Waste Site) document form, Weyerhaeuser commented that periodic maintenance and cell replacement during the period of 1956-1974 produced a variety of materials having a very slight mercury contamination. These were piled in the area of the brine sludge ponds (see above) plus (allegedly) also an area on the west

side of the site, just to the northwest of the on-site production wells (Figure 1). Whereas the 103c notification states an estimate of 2,000 cubic yards of hazardous wastes landfilled on-site, with only a suspected release to the environment, a comprehensive study of aerial photographs covering that time period could not verify that any wastes were indeed placed in this western area (Ken Johnson letter 11/24/86).

During the tour of the site premises these two areas were pointed out to me, with details presented of where and how soil samples were collected. Although Weyerhaeuser did make an initial commitment to address all the concerns indicated in the PA (see above), it was made clear to me that the area of immediate interest to them was the "west site," just to the northwest of their two production wells. Their current plans call for development of the entire area to the west of the chlorine plant, only part of which is comprised by the "west site" area.

Figure 2 shows the five Weyerhaeuser sample locations (circled numbers) and directions of photographs taken (numbered arrows) at the site as it is today. Photograph numbers one (looking to the east) and number two (looking to the west) show the west site area where Weyerhaeuser soil sample site locations 1-3 were located. The area is approximately 200 feet square (about one acre). These three points were selected as the best approximation to where it was thought that some of the mercury-contaminated wastes could have been landfilled. A backhoe was used to dig down, with samples collected from different layers (visually discriminated), as described in their report, down to 14 feet for sites 1 and 3 and 15 feet for site 2. They reported no evidence of demolition debris/materials during the excavations.

Photograph numbers three and four show views of the soil sample site locations 4 and 5 to the east of the former mercury cell room (the old brine pond area). Site 4 was thought to be directly above the river-most brine pond and expected to be the worst case situation. It was possible to excavate to a depth of only 10 feet due to the presence of bedrock, as was the case at site 5, where bedrock was encountered already at a depth of five feet.

During the course of the SI Weyerhaeuser described the results of their mercury, and other metals, analyses carried out on all the samples (to be covered in the following section). No Ecology samples were collected at this time, pending the outcome of the total investigation at the Phase I stage and recommendations made.

It was strongly recommended to Weyerhaeuser to obtain either background (off-site) samples for mercury concentrations, or proper documentation of these levels, if sampled during a previous investigation.

5.0 RESULTS AND DISCUSSION

Mercury concentrations (mg/kg or ppm) in the different soil samples taken at the five site locations can be summarized in the following table (8):

<u>Depth (feet)</u>	<u>Site Number</u>				
	<u>W-1</u>	<u>W-2</u>	<u>W-3</u>	<u>E-4</u>	<u>E-5</u>
2	12	16	1.1	1.1	0.90
5	1.3	9.6	0.13	1.6	27.0
7	0.35	-	-	-	-
9	-	0.4	0.8	-	-
10	0.10	-	-	0.72	-
14	<0.05	-	<0.05	-	-
15	-	0.07	-	-	-

It can be seen that, on the west site, the mercury concentrations fall off sharply with depth, with the maximum value recorded being 16 ppm at site 2 at two foot depth. EP toxicity measurements made on all the west site samples showed no detectable levels of extractable mercury.

The maximum mercury concentration measured on the east site was 27 ppm, at bedrock, at site 5. Again, EP toxicity determinations showed no detectable levels for mercury in any of the eastern soil samples.

Results of mercury analyses for the other media can be summarized as follows:

River Water and On-Site Wells (Ground Water)

No significant measurements recorded, either up- or downstream (Columbia River) or in the two on-site production wells.

River Sediments

No values recorded downstream significantly elevated, or high, with respect to upstream samples. Sediments just off-site recorded maximum values, however, were below 1 ppm, the level at which contamination from discharge of mercury-bearing wastes is suspected (9).

The entire length of the Columbia River along through this area is constantly being dredged by the Army Corp of Engineers.

River Fish Tissues

Only trace amounts recorded, with no significant difference between up- and downstream samples, which were generally an order of magnitude less than EPA standards for edibility.

On-Site Surface Water

Of the three surface water streams on-site which were sampled, two had less than National Priority Drinking Water Maximum Contaminant Levels (MCL, Appendix A) for mercury (0.002 ppm) while the third significantly exceeded that limit (0.034 ppm). This latter stream drains to an in-plant sump, and undergoes treatment prior to discharge through a shared NPDES-permitted discharge with Weyerhaeuser's adjoining pulp mill (Ken Johnson, personal commun., 12/2/86). The fate of any mercurial residues at this sump is unknown.

There were no significant concentrations of zinc (concern singled out in the PA), or of any other metal species, determined in any of the various media analyzed.

Mercury is one of the most hazardous heavy metals present in the environment, however, the toxicity varies greatly with its chemical form, and mode of exposure. It may exist in the environment as either its elemental form, mercurous ion ($\text{Hg} + 1$) or the mercuric ion ($\text{Hg} + 2$).

Elemental mercury, in liquid form, is relatively nontoxic to human beings via an oral ingestion route, whereas it can be described as highly toxic via dermal (high lipid solubility) and inhalation (slightly volatile at room temperatures) routes (10).

The monovalent form of mercury is relatively nontoxic due to the low solubility of its salts (11). E.g., under mildly reducing conditions, such as in anoxic sediments (or soils), ionic mercury is generally precipitated as a relatively insoluble sulfide (*ibid*). However, in tissues and erythrocytes, monovalent mercury can be oxidized to the more toxic divalent ion. This specie can also undergo bacterial methylation to form methyl- and dimethyl mercury, the organo-mercury compounds most readily and rapidly bioconcentrated within the food chain. These transformations occur in sediments and represent the entrance mechanism of mercury into biota food uptake. In general, inorganic mercurials are not significant problems in contamination of the environment (11).

The issue at hand here is that of all the environmental compartments analyzed (soil, ground water, surface water, sediments, fish tissues), significant mercury concentrations were determined only in the surficial on-site soils. This was confirmed by the results of the requested off-site (background) control samples subsequently collected and analyzed by Weyerhaeuser (Appendix A), showing e.g. mercury concentrations ranging from 0.05 ppm (limit of detection) on the pulp mill plant site upriver from the chlorine plant, to 0.09 ppm several miles to the north.

In order to develop a course of action to address this contamination, and make any recommendations regarding its fate, several key aspects have to be taken into consideration.

First, the source of mercury. According to Weyerhaeuser's 103(c) notification, and subsequent discussions with Mr. Ken Johnson (Nov. 24, 1986 letter, Appendix A), there was an estimated 2,000 cubic yards of process waste material generated over a period of 19-20 years, originating from the east site, with an unknown portion alleged to have been landfilled on the west site.

The "worst case" calculations made by Weyerhaeuser for this notification arrived at a figure of 1,419.9 pounds of mercury wastes for this period. Two-thirds of this amount is based on the one-time measured value of 350 ppm mercury in the grout removed when cell changes occurred. The remainder was mainly through replacement of the mercury contaminated anodes, again using a value (190 ppm) obtained during the 1974/75 demolition process.

Thus while the precise amount of mercury-contaminated wastes will never truly be determined, nor will it be established what amount went to the west site (see Ken Johnson 11/24/86 letter) the predominant evidence is that elemental and/or inorganic species of mercury were involved.

Second, the fate. File records indicate that upon demolition of the mercury process facilities and removal and transport out of state of 24,000 cubic yards of contaminated materials, the east site was leveled with clean fill with a final cover of packed gravel. The west site, if used as a landfill as alleged, would have had alternate coverings of river dredge spoils, plus eventual gravel cover during ensuing development of the area. The enclosed photographs document this cover on both sites.

Third, exposure routes. Mercury analyses made show higher than background concentrations primarily at the 2-5 foot depths for both sites, with highest concentrations at the former for the west site and at the latter for the east. Well logs for the on-site production wells just to the southeast of the west site indicate fill down 8 feet, clay and fine sand 8-30 feet, with gray clay (sticky) 30-181 feet. It is known that mercury is strongly adsorbed by clay (12), thus any mercury present at depth would be basically immobilized. This is confirmed by the findings for the EP toxic determinations carried out for mercury. The higher concentrations measured on the east site at 5 feet apparently reflects the addition of clean fill and possible waste accumulation at bedrock (5 feet).

The entire area of the west site is to be further covered over as part of a larger development in that area. Fill material (approved) will be added to level the surface and it will be blacktopped over. There will be no possible exposure route via contact or vaporization of any mercury currently present. Obviously, too, infiltration by surface waters will be minimal in this area.

The only literature reference located for criteria for soil mercury levels was from the British Dept. of the Environment (Appendix A). For public open spaces (includes formal play field areas, park land, and informal recreational areas) the criteria for mercury is set at

20 ppm, which apparently satisfies the situation of the west site as is.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Weyerhaeuser conducted a comprehensive multi-environmental compartment sampling exercise at its (former) chlor-alkali plant site in Longview in February 1986, based on the follow-up recommendations presented in the potential hazardous waste site PA submitted to them by Ecology several months earlier. While I cannot offer my commendations for their apparent lack of communication with Ecology during the initial phases of their sampling plan development, in principle I concur with their rationale which eventuated in Mr. Fisher's July 1986 publication.

That there is some on-site mercury contamination cannot be doubted, however, no evidence was produced which indicates off-site migration into ground or surface waters.

Due to the ranges of mercury concentrations involved, it is questionable as to whether downstream values for sediment and fish tissue samples are significantly higher than upstream. Both sets of results, however, fall within an environmentally acceptable limit.

On the basis of the only current literature reference found for soil mercury levels (20 ppm criteria for land use higher in public contact than the west site), and the environmental considerations present, the desired land use of the west site by Weyerhaeuser should be allowable.

It is recommended, however, that Weyerhaeuser submit a plan and schedule of implementation for a series of not less than two shallow monitoring wells in the area west of the pulp mill effluent lines and east of the boat launch ramp halfway between the paved parking lot currently in use and the river, along with one upgradient well. These shall serve to monitor for any past or future lateral migration of mercurial species.

Furthermore, it is recommended that Weyerhaeuser make proper notification about appropriate safety concerns to be exercised during any excavations required in their future development of the west site property. A notation on the deed to the property should be recorded that will in perpetuity notify any potential purchaser that the above reported levels of mercury contamination are present.

Lastly, it is recommended that Weyerhaeuser obtain further quantification of the residual mercury contamination at the east site and the caustic storage ditch, with appropriate and timely consultation with Ecology regarding any sampling and hydrogeological studies.

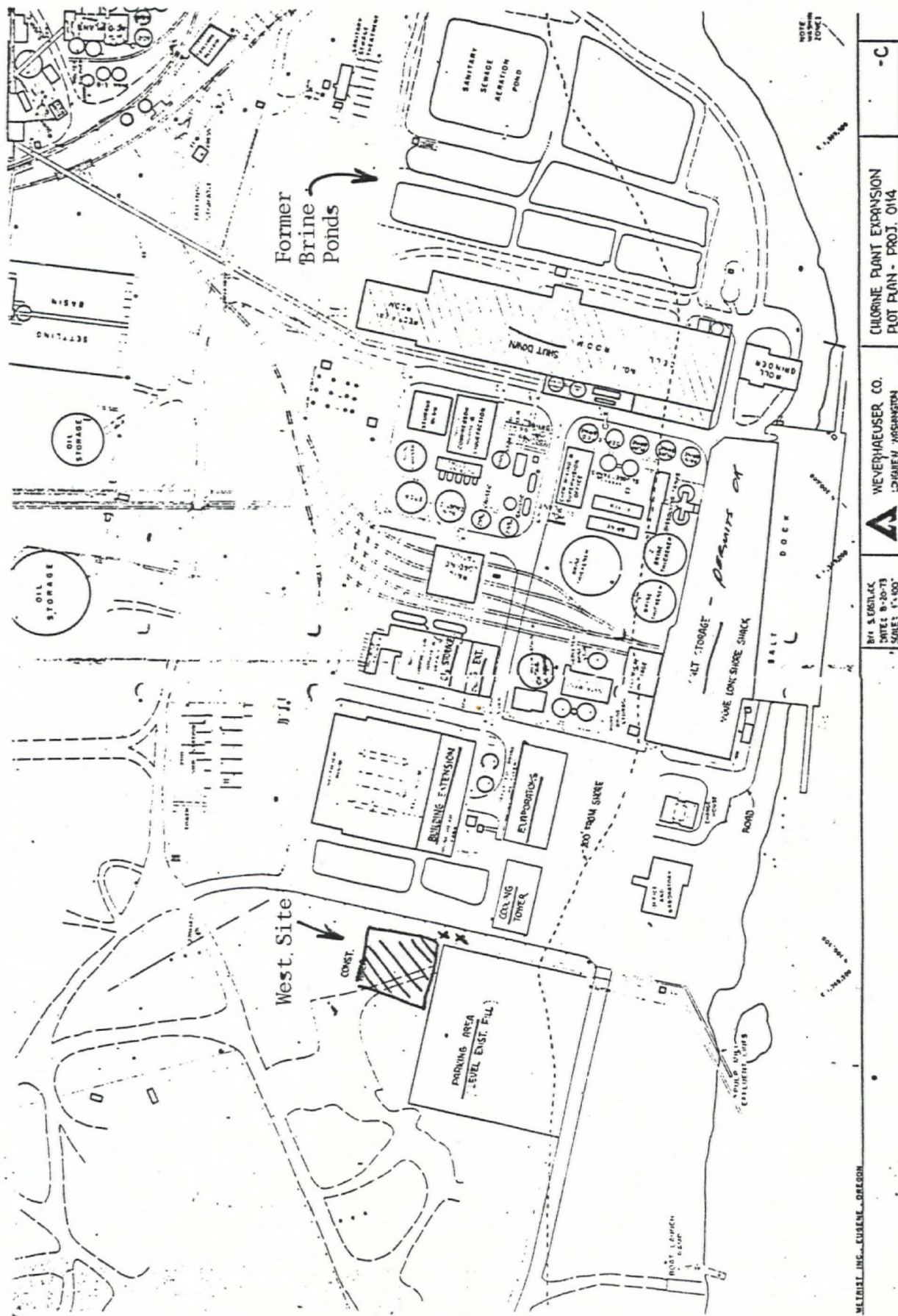
Once these have been accomplished to Ecology's satisfaction in meeting the appropriate standards, it will be recommended that no further CERCLA investigation, under the PA/SI program, be carried out at

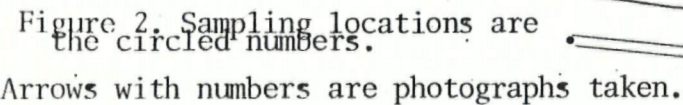
this site and that it be removed from the CERCLIS list of active sites and placed on the EPA list of sites requiring no further action.

7.0 REFERENCES

1. Ecology Plant Inspection (August 3, 1970) Report (Appendix A).
2. U.S. Geological Survey, 1978. Kelso, Cowlitz County, Quad. 7.5 Minute Series (Topog.).
3. U.S. Geological Water-Supply Bulletin No. 35. Availability of Ground Water in Western Cowlitz County, Washington. 1970.
4. Soil Survey of Cowlitz Area, Washington U.S. Dept. Agriculture. Feb. 1974 and General Soil Map, Washington, May 1968, USGS.
5. Principle Aquifers and Well Fields in Washington, Geohydrologic Monograph 5, USGS, Ecology, 1980.
6. Ecology Preliminary Assessment (and files) Jan. 1985.
7. Investigations - Mercury in Washington State. R. A. Lee. Ecology. 1971.
8. J. N. Fisher, Weyerhaeuser Company, Assessment of the Environmental Effects of Residual Mercury near the Longview Chloralkali Plant. Revised report received by Ecology October 15, 1986.
9. Mercury in the Aquatic Environment. Hazards and Controls. Environment Canada, March 1985.
10. Effect, Pathways, Processes and Transformations of Puget Sound Contaminants of Concern. NOAA. July 1982.
11. Toxicity of Heavy Metals in the Environment. Part I. Ed. F.W. Oehme 1978.
12. Distribution and Transport of Mercury Within the Nooksack River Drainage, Whatcom Co., Washington. R. Thomas Falley, MSC Thesis, Western Washington State University, June 1970.

Figure 1. Weyerhaeuser Chlor-alkali plant prior to conversion to the diaphragm cell process. x = Wells.





NO.	DATE	PRINTS TO	REV.	DATE	REV. NO.	TABLE OF REVISIONS	BY	DATE	REV. NO.	TABLE OF
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10119-070-342-00

File Original and First Copy with
Department of Ecology
Second Copy -- Owner's Copy
Third Copy -- Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No.

Permit No.

(1) OWNER: Name Weyerhaeuser Company Address Tacoma, Washington 98401

(2) LOCATION OF WELL: County Cowlitz 1/4 Sec. T. N. R. W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☒ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) _____
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 202 ft. Depth of completed well 202 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8 " Diam. from 0 ft. to 172 ft.
Threaded ☐ " Diam. from _____ ft. to _____ ft.
Welded ☒ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☒ No ☐
Manufacturer's Name UOP Johnson
Type Stainless Model No. 177
Diam. 40 Slot size 50 from 172 ft. to 182 ft.
Diam. 70 Slot size 70 from 182 ft. to 192 ft.
Diam. 80 Slot size 80 from 192 ft. to 197 ft.
Gravel packed: Yes ☐ No ☒ Size of gravel: 202
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal _____
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation _____
above mean sea level. _____
Static level 20 ft. below top of well Date 3/8/74
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Driller
Yield: 510 gal./min. with 1.3 ft. drawdown after 4 hrs.
650 " 2.3 " 4 1/2 "

Flow data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
------	-------------	------	-------------	------	-------------

Flow of test 3/8/74

Flow test: _____ gal./min. with _____ ft. drawdown after _____ hrs.

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Fill, silty sandy clay	0	16
Silty sandy clay	16	36
Light brown sandy clay	36	65
Sandy clay, sticky	65	110
Blue sandy clay, silty	110	176
Sand & gravel	176	202
Hardpan	202	

Work started 2/13/74 Completed 3/8/74

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Richardson Well Drilling Company
(Person, firm, or corporation) (Type or print)

Address P.O. Box 44408, Tacoma, Wa. 98444

[Signed] _____ (Well Driller)

CORRESPONDENCE/
HISTORICAL

NATIONAL PRIORITY DRINKING WATER REGULATIONS

MAXIMUM CONTAMINANT LEVELS (MCLs) (mg/l)*

Primary Standards		Chlorinated Hydrocarbons		Chlorophenoxys		Miscellaneous	
Arsenic	0.05	Endrin	0.0002	2,4-D	0.1	Cyanide	0.05
Barium	1.0	Lindane	0.004	2,4,5-TP Silvex	0.01	Phenols	0.001
Cadmium	0.01	Methoxychlor	0.1			Carbon Chloroform Extract	0.2
Chromium (Cr ⁶⁺)	0.05	Toxaphene	0.005			Synthetic Detergents -	0.5
Lead	0.05						
Mercury	0.002						
Nitrate (as N)	10.0						
Selenium	0.01						
Silver	0.05						
Antimony	0.01						

PROPOSED MAXIMUM CONTAMINANT LEVELS (MCLs) (mg/l)**

Vinyl Chloride	0.001
Benzene	0.005
Carbon Tetrachloride	0.005
1,2-dichloroethane	0.005
Trichloroethylene	0.005
1,1-dichloroethylene	0.007
1,1,1-trichloroethane	0.2
p-dichlorobenzene	0.75

PROPOSED RECOMMENDED MAXIMUM CONTAMINANT LEVELS (RMCLs) FOR CHEMICAL AND MICROBIOLOGICAL PARAMETERS (mg/l)

Inorganic Chemicals		Synthetic Organic Chemicals		Microbiological Parameters	
Arsenic	0.05	Acrylamide	0	Giardia	0 organisms
Asbestos	7.1 x 10 ⁶ long fibers/L	Alachlor	0	Total coliforms	0 organisms
Barium	1.5	Aldicarb (including two by-products, aldicarb sulfoxide & aldicarb sulfone)	0.009	Turbidity	0.1 nephelometric turbidity unit
Cadmium	0.005	Carbofuran	0.036	Viruses	0 organisms
Chromium (Total)	0.12	Chlordane	0		
Copper	1.3	cis-1,2-Dichloroethylene	0.07		
Lead	0.02	Dibromochloropropane (DBCP)	0		
Mercury	0.003	1,2-Dichloropropane	0.006		
Nitrate	10.0	o-Dichlorobenzene	0.62		
Nitrite	1.6	2,4-Dichlorophenoxyacetic acid (2,4-D)	0.07		
Selenium	0.045	Epichlorohydrin	0		
Fluoride	0.004	Ethylbenzene	0.68		
		Ethylene dibromide (EDB)	0		
		Heptachlor	0		
		Heptachlor epoxide	0		
		Lindane	0.0002		
		Methoxychlor	0.34		
		Monochlorobenzene	0.06		
		Pentachlorophenol	0.22		
		Polychlorinated Biphenyls (PCBs)	0		
		Styrene	0.14		
		Toluene	2.0		
		Toxaphene	0		
		trans-1,2-Dichloroethylene	0.07		
		2-(2,4,5-Trichlorophenoxy) propionic acid (2,4,5-TP)	0.052		
		Xylene	0.44		

SECONDARY STANDARDS*

Bron	1.0 mg/l	Odor	3 threshold odor No
Chloride (Cl)	250 mg/l	pH	6.5 to 8.5
Color	15 color units	Sulfate (SO ₄ ²⁻)	250 mg/l
Copper	1 mg/l	TDS	500 mg/l
Foaming Agents	0.5 mg/l	Zinc	5 mg/l
Iron	0.3 mg/l		
Manganese	0.05 mg/l		
Nitrate (NO ₃ -)	45 mg/l		

* EPA, 1973

** EPA, Federal Register, 11/13/85



Weyerhaeuser Company

Tacoma, Washington 98477
(206) 924-2345

November 26, 1986

Mr. Michael J. Spencer
Hazardous Waste Programs
Washington State Department of Ecology
Mail Stop PV-11
Olympia, WA 98504-8711

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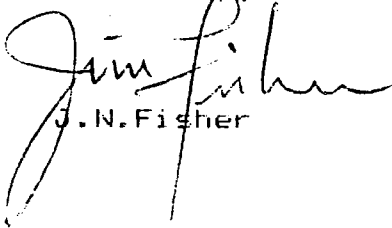
DEPT OF ECOLOGY
OLYMPIA, WA.

Dear Mr. Spencer,

Attached is a set of data from analyses of surface soils for total mercury concentration collected at various locations around the Longview area. As we discussed, this was an effort to determine background soil mercury levels in the areas surrounding the Weyerhaeuser Longview Chloralkali plantsite. You will note that these mercury data values range from less than detectable levels (0.05 mg/kg) to 0.09 mg/kg. The highest of the levels occurred in samples collected several miles from the plantsite near a housing development called Mint Valley. The range of concentrations detected here are similar to the values from the lower end of the ranges found in the soils samples collected near the plantsite, as described in the July 1986 report.

If you have any questions or comments, please give me a call at 924-6825.

Sincerely,


J.N. Fisher

**Analytical Laboratories
Tacoma, Washington**

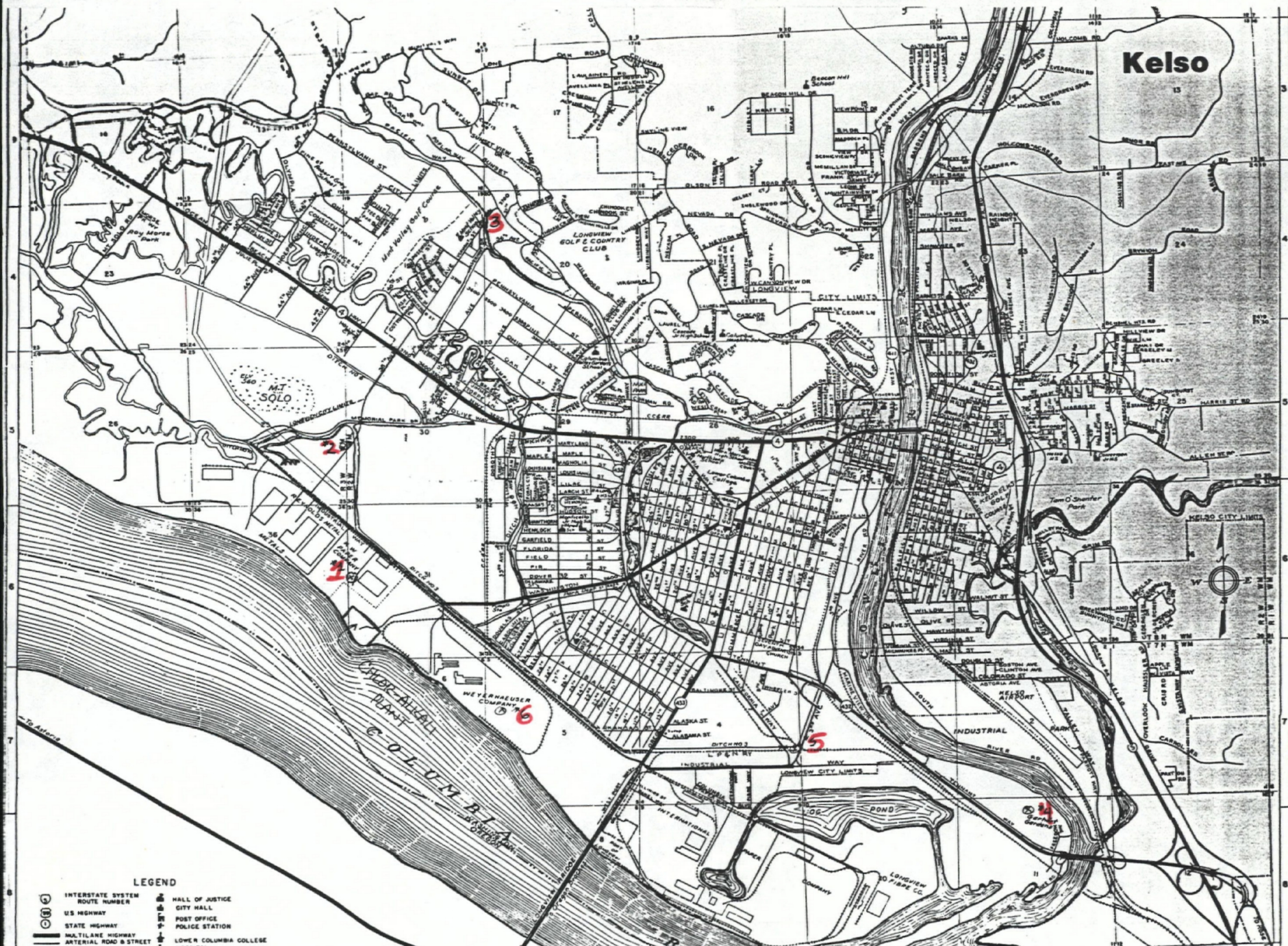
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Page of

LONGVIEW SOIL MERCURY ANALYSES

[illegible]

Approved Jeff Chubb Date 11-25-86 Notebook _____

Page Number _____



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| | INTERSTATE SYSTEM ROUTE NUMBER | | HALL OF JUSTICE |
| | US HIGHWAY | | CITY HALL |
| | STATE HIGHWAY | | POST OFFICE |
| | MULTILANE HIGHWAY | | POLICE STATION |
| | ARTERIAL ROAD & STREET | | LOWER COLUMBIA COLLEGE |

Mike - FY5 G. b
Orrison

Table 2-5
SOIL CRITERIA FROM THE BRITISH DEPARTMENT OF THE ENVIRONMENT
(mg/kg dry soil)

	Small Garden ^a	Large Garden	Amenity Grass ^b	Public Open Space ^c
Cadmium	5	3	12	15
Lead	550	550	1,500	2,000
Mercury	1.5	1	4	20
Chromium				
Total	600	600	1,000	1,000
VI ^d	25	25	25	25
Molybdenum	5	5	5	5
Arsenic	20	10	40	40
Selenium	3	3	3	3
Boron ^e	3	3	3	3
Barium ^d	125	125	125	1,000
Antimony ^d	60	60	60	500
Fluorine	800	800	800	1,000

^a Arbitrarily defined as less than 75 square meters (m²) in area.

^b Includes schools, play areas, and recreational areas around residential development where there may be regular contact by small children. Areas where there may be more intensive use by small children (e.g., nursery schools) should be treated as domestic gardens.

^c Includes formal play field areas, parkland, and informal recreation areas.

^d Soluble fraction in 0.1 M HCl or solution corrected to pH 1.0 if alkaline substances present.

^e Water soluble boron.

Source: Smith, 1981.



Weyerhaeuser Company

Longview, Washington 98632
A/C 206 • 425-2150

November 24, 1986

REC-11

Michael Spencer
Hazardous Waste Clean-up Programs
Department of Ecology
MS PV-11
Olympia, WA 98504

'86 NOV 26 10:22

DEPT. OF ECOLOGY
OLYMPIA, WA.

Dear Mr. Spencer:

As we discussed on November 18, I am enclosing a copy of the work sheet which displays the worst-case calculation of mercury-contaminated waste materials possibly disposed of at locations around the Chlor-Alkali plant.

You should recognize this analysis is truly worst case. The calculation of total mercury assumes a full operating rate, high mercury waste concentrations, and most importantly, that the waste materials were, in fact, disposed of adjacent to the production facilities. Despite interviewing former and current employees, and reviewing site photos through time, we have not produced conclusive evidence that these materials were land disposed. The Spring, 1986 soils sampling at the indicated "hot spots" (based on interviews and photos) yielded no evidence of Chlor-Alkali plant cell wastes. To be fair, we have not been able to establish how these waste materials might otherwise have been dealt with (particularly those generated in the 1956-1970 period).

Finally, I should point out that this attempt to portray the worst case was consistent with our Corporate philosophy of, if anything, erring on the side of over-reporting for Superfund filings.

Feel free to contact me with any additional questions you might have.

Sincerely,

Ken Johnson
Region Environmental Engr.

KJ:ph
Attachment

Assumptions - Worst case analysis so assume all mercury wastes were land disposed through entire mercury cell production process (1956-1975). There is little direct supporting evidence for this worst case scenario.

Sources of Mercury

- 1) Anodes Cell Room #1 - 126 cells; operated 1956-75
Cell Room #2 - 16 cells; operated 1966-75

Each cell had 42 anodes; dimension of anode at time of disposal = 31"x13½"x1"; ~20% of volume is machined away

Density of graphite anode is 1.56 gr/cc

Anodes replaced each 9 months; assume disposed of on millsite (except demolition materials to Chem-Nuclear, Arlington)

Mercury contamination - 190 ppm

Anodes present =
(126 cells x 42 anode/cell x 19 year x 12 mo/yr x change/9 months) - (126 cells x 42 anode) = 128,772
(16 cells x 42 x 19 x 12 x 1/9) - (16 x 42) = 7,392
Total Anodes = 136,164

Weight 31" x 13½" x 1" = 0.2421 ft.³
(0.2421 ft.³ x 0.8 volume) x 136,164 = 26,381.7 ft.³
1.56 gr/cc x 2.205 x 10⁻³ lb/yr x 2.832 x 10⁴ cc/ft.³ x 26381.7 ft.³ = 2,569,976 lb.

Mercury Present

2,569,976 lb. anodes x 190 lb/M² lb. = 488.2 lb. Hg

- 2) Grout Grout changed every 4-5 cell changes in cell room #1; no grout in cell room #2.
- Quality of grout each change = high estimate 250 ton
- mercury concentration in grout = 350 ppm
- Number of grout changes = 19 years x 12 mos./yr. x cell change/9 mos. x
grout change = 6.3 grout changes
4 cell changes

- Worst case grout disposal on millsite =
250 ton X (6.3 changes - 1 change to
Chem Nuclear) = 1325 ton or 2,650,000 lbs.

- Mercury present = 2,650,000 lbs. x $\frac{350 \text{ lb/M}^2\text{lbs}}{927.5 \text{ lb. Hg}}$ =

3) Filter
Sand

- Mercury brine was run through filter sand
- Filter sand was replaced once, assume disposal
on millsite
- Quantity of sand - worst case estimate = 90 ton
- Mercury concentration in sand = 18 ppm
- Mercury present = 90 ton x 2000 lb/ton x
 $\frac{18 \text{ lb/M}^2\text{lb}}{3.24 \text{ lb Hg}}$ = 3.24 lb Hg

4) Rubber Cell
Covers

- Mercury present - estimate 1.0 lb Hg

TOTAL

1,419.9 Hg



Weyerhaeuser Company

Tacoma, Washington 98477
(206) 924-2345

October 13, 1986

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Michael Spencer
Department of Ecology
Mail Stop PV-11
Olympia, WA 98504-8711

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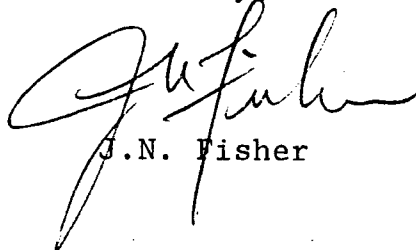
DEPT. OF ECOLOGY
OLYMPIA, WA.

Dear Mike:

Attached is a copy of the revised report on the Longview Chloro-Alkali Plant study. All of the revisions per our recent meeting should be included.

If you have any questions, give me a call at (206) 924-6825.

Sincerely,



J.N. Fisher

JNF:kp

cc: R.A. Anderson - CH 1M31

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**ASSESSMENT OF THE ENVIRONMENTAL EFFECTS
OF RESIDUAL MERCURY NEAR
THE LONGVIEW CHLORALKALI PLANT**

Project No. 044-8613

By

**J. N. Fisher
Weyerhaeuser Company**

July 1986

**Revised Version
Received by Ecology
October 15, 1986**



Weyerhaeuser

RESEARCH REPORT
Research & Development

- ☐ Technical Report ☐ Trip Report
☐ Technical Note ☐ Other

Summary Page

Project No. 044-8613
Page 1 of 12

TITLE: ASSESSMENT OF THE ENVIRONMENTAL EFFECTS OF RESIDUAL
MERCURY NEAR THE LONGVIEW CHLORALKALI PLANT

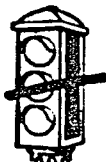
OBJECTIVE

Conduct a study to determine the extent of residual mercury presence in samples of soils, groundwater, surface water, process water, river sediments, and aquatic (fish) organisms in the vicinity of the former mercury-cell chlorine plant at Longview.

SUMMARY OF RESULTS

1. A comprehensive sampling survey was conducted in the vicinity of the Longview Chloralkali Plant February 18-20, 1986, which included collection of site runoff, process water, and Columbia River water samples; site soils and river sediments; groundwater from existing wells on the site; and fish tissue samples from upstream and downstream of the plant.
2. All samples were analyzed for concentrations of total heavy metals, and for RCRA EP-Toxicity heavy metals.
3. Results showed:
 - a. Mercury and zinc were non-detectable in mill effluent, groundwater, and river water.

DISTRIBUTION TO TECHNICAL INFORMATION CENTER	LOCATION TIC	AUTHOR'S SIGNATURE <i>J. N. Fisher</i>	DATE 10/13/86
		AUTHOR'S NAME (Typed) J. N. Fisher	
PROJECT NO. 044-8613		APPROVED BY (Signature) <i>[Signature]</i>	DATE 10/13/86



Strictly Proprietary (Red): Disclosure strictly limited to persons on a managed list. Contact
 Proprietary (Yellow): Disclosure limited to persons confidentially bound to Weyerhaeuser on a need to know basis.
 Non-Proprietary (Green): Disclosure unlimited.



- b. Mercury residuals in the millsite surface drainage ditch water showed levels above river sample values (river values <0.0002 ; ditch values 0.0016-0.034 ppm); however, these were near or below the drinking water standard of 0.002 ppm.
- c. River sediment concentrations of metals at and downstream of the plant site were similar to upstream background locations.
- d. River fish tissue samples showed residual mercury concentrations were present in only trace amounts (range 0.03 to 0.12 ppm) with no significant difference between upstream and downstream sample stations, and were generally an order of magnitude less than the EPA standard for edibility of 0.5 ppm.
- e. Soil samples from two locations on the plant site showed a broad range of residual mercury concentrations. The stations east of the plant site showed levels over the range of 0.7 to 27.0 ppm, whereas those to the west of the plant (downriver side) showed values from <0.05 to 16 ppm. The higher levels of mercury were confined to soil layers near the surface. The concentrations decreased to trace amounts as the soil depth increased. RCRA EP-Toxicity analyses (per WDOE 173-303), however, showed no detectable mercury in any of the soil samples, suggesting stability of mercury within the soil column.
- f. Conclusions from the study suggest that there is no significant effect on the environment in the vicinity of the Longview Chloralkali Plant from mercury, zinc, or other heavy metals measured during this study.



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INTRODUCTION

At the request of the mill staff from the Weyerhaeuser Longview Chloralkali Plant, the Environmental Sciences Team from the Weyerhaeuser Technology Center conducted a study to evaluate and assess the effects on soils, surface and groundwater, and river sediments and biota from mercury, zinc, or other heavy metals residuals associated with past manufacturing practices at the mill location. The following report summarizes the results of the study which was performed during February 18-21, 1986.

EXPERIMENTAL DESIGN

The study plan was developed in conjunction with discussions held with mill and region staff at the Weyerhaeuser Longview Chloralkali Plant. The sample plan covered a fairly broad area of the SW Washington region, which included upstream river background stations at the Kalama River mouth, the Columbia River below the Kalama River confluence, the Columbia River above the Cowlitz River confluence, the Cowlitz River mouth, the Columbia River near the Weyerhaeuser Longview Pulp Mill water intake, the Columbia River near the Chloralkali Plant, and several locations downstream from the plant site, as far as Willow Grove (see maps for sample sites).

Specifically, the sample plan called for collection and analyses of samples from the following basic categories:

1. Water Samples
 - . Surface water runoff
 - . Effluent discharges
 - . River water - upstream, dock vicinity, downstream
2. Soil Samples
 - . Plant site soils



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3. Sediment Samples

- . Columbia River - upstream, dock vicinity, downstream
- . Cowlitz River - mouth

4. Groundwater Samples

- . Pulp mill wells
- . Chloralkali plant wells

5. Fish Tissue Samples

- . Kalama River fish
- . Columbia River fish near Kalama confluence
- . Columbia River fish above the Cowlitz River
- . Cowlitz River fish
- . Columbia River near chloralkali plant
- . Columbia River downstream locations

The method of collection of the above samples was as follows:

	<u>Sample Type</u>	<u>Collection Method</u>
1.	Water - runoff - river - effluent	Grab Van-Dorn depth-integrated sampler (surface, mid-depth, bottom composites) Automatic compositer
2.	Soils - plant site	Backhoe excavation - grab (at each new strata)
3.	Sediments	Clam-shell dredge (6 cu in.) Drag dredge (6 cu in.)
		avg. 6-in. } sample depth
4.	Groundwater	Grab from existing wells (2)
5.	Fish tissue	Beach seine (0.5 in. mesh) Fish traps (2 cu ft size) Monofilament gillnet (variable mesh)



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After collection, all samples were chilled to 4°C and transported to the Weyerhaeuser Technology Center (WTC), Tacoma, Washington, for analyses. The WTC is a certified EPA contract laboratory, and is well-suited for the type of analyses required of this study. The following is a summary of the analyses conducted on each of the major sample categories:

	<u>Sample Type</u>	<u>Analytical Procedure</u>
1.	Water - all sources	Total metals scan
2.	Soils	Total metals scan RCRA EP-toxicity metals
3.	Sediments	Total metals scan RCRA EP-toxicity metals
4.	Groundwater	Total metals scan
5.	Fish tissue	Total metals scan (whole fish extract)

All analytical procedures applied in the study followed specifications outlined in EPA test methods procedures manual SW-846, 1984 edition.



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RESULTS

Figure I is a map showing the sample sites external to the Longview Chloralkali plant site, including all of the river locations up and downstream. Figure II is a map showing the sample points on the mill site itself.

Table I is a summary of the range of mercury values measured in each of the major sample source groups. This was included in an effort to show the comparison of levels in upstream to downstream stations, and the relationship to data collected on the mill site.

The Table II series enumerate the total metals concentration data from the three major water sample sources. Table IIA lists the surface runoff data. Table IIB shows the effluent data. Table IIC shows the river water data from the various sample locations.

Tables IIIA and IIIB list the total and EP-toxicity metals values, respectively, for all the soils samples collected on the mill site.

River sediments data for total metals are shown in Table IVA, whereas the EP-toxicity metals values for the river sediments are indicated in Table IVB.

Groundwater data for total metals appears in Table V for each of the two wells that were sampled.

The fish tissue mercury and zinc concentration data (in mg of metals per kg of fish tissue analyzed) are summarized in Table VI, and appear according to major fish family groups collected at each sample station. Table VII lists all other heavy metals from the fish tissue analyses.

Appendix VIII includes copies of well logs from the two process water wells located near the western edge of the chloralkali plant. The logs provide information on the soil profile under the plantsite, and near the soil sampling area located west of the plant.



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Figure I
River Sample Site Locations



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FIGURE I

RIVER SAMPLE SITE LOCATIONS

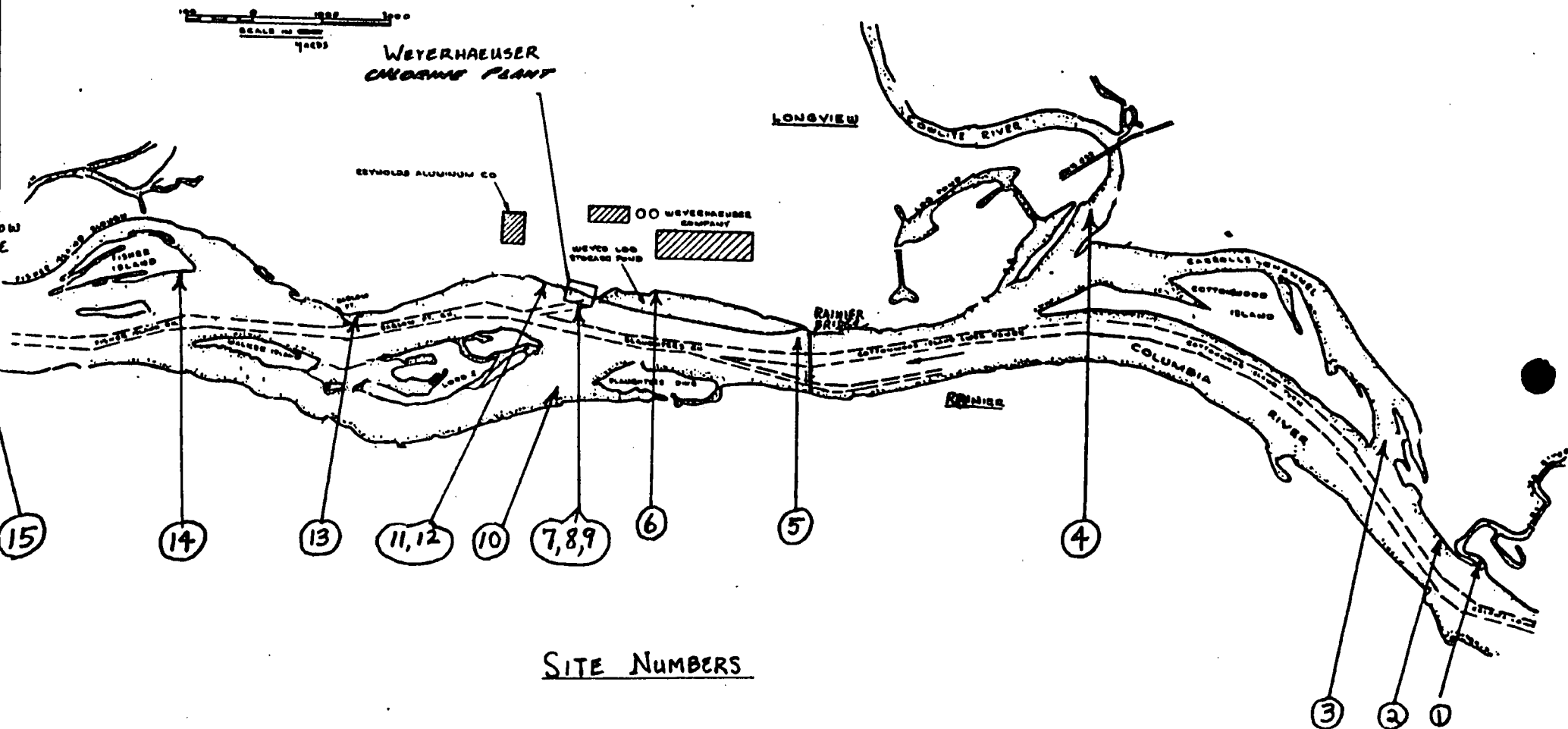




Figure II

Weyerhaeuser Longview Chlorine Plant
Plant Site Sample Locations (Soils)
(Sample sites indicated by circled numbers)



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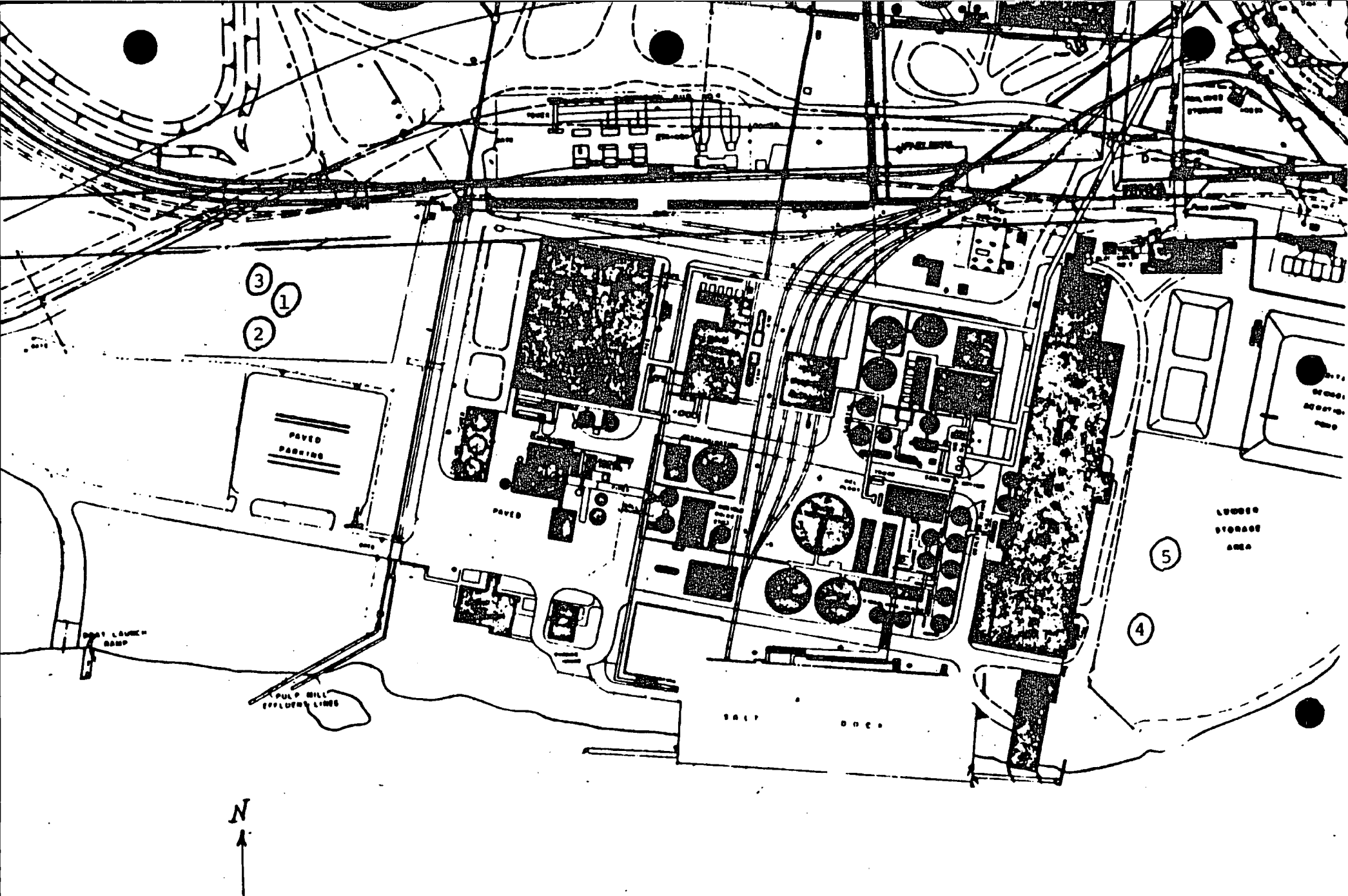


FIGURE II
 Weyerhaeuser Longview Chlorine Plant
 Plantsite Sample Locations (SOILS)
 (Sample sites indicated by circled numbers)

— DRAIN DITCH
 — CULVERT
 BRUSH
 CRACK



DISCUSSION

Except for the more surficially oriented soils near the Longview Weyerhaeuser Chloralkali Plant, there is no apparent indication of elevated mercury levels in the various environments surrounding the mill site location. This is readily evident from the Table I data which shows the range of mercury values from the many sample stations upstream and downstream of the plant. In fact, mercury was not detected in any samples of groundwater, river water, or mill effluent (lower detection limit 0.0002 ppm), as shown in Tables V, IIc, and IIb, respectively. Only a trace of mercury was detected in the three small surface water drainage ditches sampled on the chloralkali plant (0.0016-0.034 ppm), as indicated in Table IIa. Two of these mercury values were less than the EPA Drinking Water Standard of 0.002 mg/L, and the third was only slightly above the standard.

As shown in Table IIIa, measurable levels of mercury (0-27 ppm) were detected in soil samples collected from two areas near the Chloralkali plant site (one just west and one east). The western sample site was selected because of the possible burial (unverified) of demolition wastes from the old mercury cell process building which may have taken place in the mid-1970s. Sampling was done in this area in efforts to locate some of the debris (which was unsuccessful), and to assess the effects on surrounding soils from the presence of any material. The mercury levels in the three sample sites in the west area ranged from <0.05 to 16 ppm as total mercury. All of the values above the detection limit (0.05 ppm) were located in the more surface-oriented soil profiles. The mercury values from all sample sites decreased significantly with depth. At depths greater than 9 to 10 ft, the soils showed only trace amounts or no detectable mercury. At the east area sample sites, bedrock (basalt) was encountered at 6 to 10 ft. Even though the west area sample sites were excavated to approximately 15 ft each, groundwater was not encountered. This suggests that the mercury present in the surficial soil zone is stable, and not migrating downwards over time. This conclusion is further supported by the EP-Toxicity metals data from Table IIIb, which essentially shows that mercury was not



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extractable under the EPA and WDOE analytical criteria for determination of hazardous levels of metals in solid samples (detection limit 0.0002) from any of the soil samples, even from the more surface-oriented strata.

The soil samples collected from the eastern portion of the plant site were from the area of the old brine ponds, which received some mercury-containing liquid waste streams during the operation of the old chlorine process. These ponds were excavated and cleaned up under WDOE supervision in the mid-1970s. The area was backfilled and now serves as a lumber storage and staging zone, with gravel surfacing. The range of values from the soil samples taken in this location showed total mercury levels from 0.7 to 27 ppm. As with the case from the western soil samples, the eastern soils showed the highest values in the uppermost layers. Similarly, the eastern soils showed no detectable levels of mercury from the EP-Toxicity analyses, demonstrating stability of the residuals present. Additionally, the well logs (Appendix VIII) for the two chloralkali plant process water wells located near the western soil sample location show several clay layers of considerable thickness between the surface and approximately 175 ft. There is a very low likelihood of any possible migration of mercury to groundwater as a result.

The river sediment sample data, Tables IVa and b, did not indicate any trends of significance. The mercury levels in the background sites upstream of the mill ranged from <0.05 to 0.26 ppm (total mercury), whereas the downstream values ranged from <0.05 to 0.07 ppm. The samples collected on the river bottom near the chlorine plant dock showed levels from 0.14 to 0.73 ppm, which are in the same range as values from the upstream samples. The range of sediment mercury values found in this study appear to be in the range of background mercury concentrations occurring in natural alluvial sediments (0.02 to 0.25 $\mu\text{g Hg/g}$), or sediments from igneous (volcanic) origins (0.03 to 1.0 $\mu\text{g Hg/g}$)¹. Upstream and downstream values measured in this study are within the above ranges. Differences between sample stations may be the result of natural variation, especially at these trace levels (lower detection limit was 0.05 ppm). Table IVb, however, shows that none of the river sediment samples contained EP-Toxicity extractable levels of mercury.



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There was no significant difference in mercury concentrations in fish tissue from samples collected upstream and downstream of the plant. This was true for essentially all of the various species collected during the study, approximately 75% of which were resident, bottom dwellers, and 25% anadromous (including coho smolts and pacific smelt). Table VI enumerates the mercury and zinc data from all the fish tissue analyses, and shows that there is little or no relationship of metal concentration to sample location (either upstream or downstream). Additionally, Table VII lists data from all other heavy metals in the fish tissue samples, and demonstrates the same situation.

Zinc analyses were conducted on all of the environmental samples collected during this study in addition to mercury and other heavy metals. There were no obvious relationships established between the measured levels of zinc and the proximity of the mill location. All riverine samples showed typical concentrations of zinc representative of background for the region.



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Table I

Mercury Data Values Range Summary
 All Sample Sources
 1986 Longview Chloralkali Plant Study

<u>Sample Source</u>	<u>Total Hg 1986 Study Values Range (ppm)</u>	<u>EP-Tox Hg (ppm)</u>	<u>Regulatory Standards (ppm)</u>
Soils			
Plant site-west	0-12	0	0.2 (EP-Tox)
Plant site-west	.07-16	0	
Plant site-west	0-1.1	0	
Plant site-east	0.7-1.1	0	
Plant site-east	0.9-27	0	
Groundwater	0		0.002
Surface Drainage	0.0016-0.034		0.002
Mill Effluent	0		-
River Water	0		
River Sediments			
Upstream	0-0.26	0	0.2 (EP-Tox)
Salt Dock	0.15-0.73	0	
Downstream	0-0.07	0	
River Fish Tissue			
Upstream	0.03-0.08		0.5
Salt Dock	0.02-0.12		
Downstream	0.07-0.05		

Table IIA

Longview Chloralkali Plant Study
 Surface Drainage Samples
 Total Metals (mg/L)

Parameter	Sample Location		
	#2 Liquifaction Ditch	Caustic Storage Ditch	Ditch Near Sanitary Lagoon
Ag	<0.01	<0.01	<0.01
Al	1.18	1.81	0.79
B	0.04	0.05	0.03
Ba	0.04	0.05	0.03
Be	<0.005	<0.005	<0.005
Bi	<0.05	<0.05	<0.05
Ca	21.7	6.73	14.4
Cd	<0.005	<0.005	<0.005
Co	<0.005	<0.005	<0.005
Cr	<0.005	0.008	<0.005
Cu	<0.01	0.09	<0.014
Fe	1.5	6.9	0.78
K	2.0	3.0	1.4
Li	<0.05	<0.05	<0.05
Mg	6.6	1.6	4.51
Mn	0.18	0.06	0.044
Mo	<0.01	<0.01	<0.01
Na	473	757	15.3
Ni	<0.04	<0.04	<0.04
P	0.23	0.39	0.14
Pb	<0.05	<0.05	<0.05
Si	-	-	-
Sn	<0.05	<0.05	<0.05
Sr	0.14	0.05	0.08
V	0.007	0.03	<0.005
Zn	0.01	0.07	<0.005
Hg	0.0017	0.034	0.0016

Table IIB

Longview Chloralkali Plant Study
Mill Effluent Samples
Total Metals (mg/L)

<u>Parameter</u>	<u>Sample Location</u>
	Longview Pulp Mill Final Effluent
Ag	<0.01
Al	1.87
B	0.08
Ba	0.063
Be	<0.005
Bi	<0.05
Ca	23.9
Cd	<0.005
Co	<0.005
Cr	0.029
Cu	0.011
Fe	0.43
K	7.3
Li	<0.05
Mg	5.5
Mn	0.220
Mo	<0.01
Na	266
Ni	<0.04
P	0.4
Pb	<0.05
Sn	<0.05
Sr	0.13
V	0.01
Zn	0.015
Hg	<0.0002

Table IIC

River Water Samples
Total Metals (mg/L)

Parameter	Sample Location								
	Kalama R. Mouth	Columbia R. @ Kalama R.	Cowlitz R. Mouth	Mill Intake	Columbia at Salt Dock	Columbia R. Oregon Side	Barlow Point	Fisher Island	Willow Grove
Ag	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Al	0.14	0.51	3.61	1.07	1.12	1.94	0.84	0.91	1.0
B	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	0.03	0.03	0.04
Ba	<0.005	0.113	0.013	0.02	0.022	0.024	0.02	0.023	0.024
Be	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Bi	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ca	4.16	16.3	9.5	16.3	16.5	9.99	15.0	17.4	17.1
Cd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Co	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cr	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cu	<0.01	<0.01	<0.011	<0.01	<0.01	<0.01	0.011	<0.01	<0.01
Fe	0.13	0.61	2.65	0.91	0.99	2.48	0.82	0.9	0.9
K	0.2	1.2	0.9	1.2	1.2	1.0	1.3	1.3	1.4
Li	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Mg	1.16	5.36	2.78	5.11	5.24	3.56	4.95	5.75	5.62
Mn	0.004	0.019	0.057	0.027	0.03	0.07	0.024	0.026	0.026
Mo	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Na	2.88	8.04	8.62	8.89	11.1	4.92	10.7	10.4	12.0
Ni	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
P	<0.10	<0.01	0.19	0.10	0.12	0.15	0.11	0.12	0.10
Pb	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sn	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sr	0.021	0.09	0.057	0.088	0.089	0.06	0.082	0.094	0.094
V	<0.005	0.005	0.007	0.005	0.005	0.009	0.005	0.006	0.005
Zn	<0.005	<0.005	0.006	<0.005	<0.005	0.009	<0.005	<0.005	<0.005
Hg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Table IIIA

Longview Chloralkali Plant Study
Mill Site Soil Samples
Total Metals (mg/kg)

The Following Data Table is Arranged According to
the Sample Designation Codes Outlined Below

<u>Sample Location</u>	<u>Sample Depth (ft)</u>	<u>Sample Code</u>
Site 1 - West Side Chloralkali Plant	2	79537
	5	79538
	7	79539
	10	79540
	14	79541
Site 2 - West Side Chloralkali Plant	2	79542
	5	79543
	9	79544
	15	79545
Site 3 - West Side Chloralkali Plant	2	79546
	5	79547
	9	79548
	14	79549
Site 4 - East Side Chloralkali Plant (Old Brine Pond Area)	2	79550
	5	79551
	10	79552
Site 5 - East Side Chloralkali Plant (Old Brine Pond Area)	2	79553
	5	79554

TABLE III A - SOILS TOTAL METALS (mg/kg)
EMISSION SPECTROGRAPHIC REPORT
MG PER MG, D.D. BASIS
SR 13502

SAMPLE	AG	% AL	B	BA	BE
79537 A	< 5.0	0.90	< 15.	103.	< 2.5
79537 B	< 5.0	0.92	< 15.	92.2	< 2.5
79538 A	< 5.0	1.11	< 15.	90.1	< 2.5
79539 A	< 5.0	0.86	< 15.	58.8	< 2.5
79540 A	< 5.0	0.67	< 15.	39.7	< 2.5
79541 A	< 5.0	0.58	< 15.	35.2	< 2.5

SAMPLE	BI	% CA	CD	CO	CR
79537 A	< 25.	0.53	< 2.5	8.9	12.
79537 B	< 25.	0.50	< 2.5	9.5	10.
79538 A	< 25.	5.68	< 2.5	10.	24.
79539 A	< 25.	0.53	< 2.5	9.7	10.
79540 A	< 25.	0.38	< 2.5	8.6	7.9
79541 A	< 25.	0.32	< 2.5	7.1	6.8

SAMPLE	CU	% FE	K	LI	% MG
79537 A	21.	1.79	448.	< 20.	0.42
79537 B	21.	1.82	450.	< 20.	0.41
79538 A	38.	1.76	545.	< 20.	1.14
79539 A	15.	1.57	351.	< 20.	0.41
79540 A	14.	1.27	329.	< 20.	0.32
79541 A	10.	1.09	271.	< 20.	0.30

SAMPLE	MN	MO	NA	NI	P
79537 A	204.	< 5.0	3340	< 20.	756.
79537 B	197.	< 5.0	3102	< 20.	697.
79538 A	479.	< 5.0	2094	23.	1000
79539 A	213.	< 5.0	773.	< 20.	664.
79540 A	163.	< 5.0	664.	< 20.	515.
79541 A	145.	< 5.0	562.	< 20.	528.

SAMPLE	PB	SI	SN	SR	TI
79537 A	< 25.	-	< 25.	46.2	-
79537 B	27.	-	< 25.	47.4	-
79538 A	53.	-	< 25.	93.6	-
79539 A	< 25.	-	< 25.	33.3	-
79540 A	< 25.	-	< 25.	29.5	-
79541 A	< 25.	-	< 25.	25.2	-

SAMPLE	V	ZN	Hg (AAS)
79537 A	48.	55.1	12.
79537 B	52.	53.8	11.
79538 A	48.	76.9	1.3
79539 A	46.	43.2	0.35
79540 A	37.	36.7	0.10
79541 A	29.	32.8	< 0.05

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EMISSION SPECTROGRAPHIC REPORT
MG PER KG, O.D. BASIS
SR 13502

SAMPLE	AG	% AL	B	BA	BE
79542 A	< 5.0	0.76	< 15.	77.2	< 2.5
79543 A	< 5.0	0.56	< 15.	108.	< 2.5
79544 A	< 5.0	0.64	< 15.	41.2	< 2.5
79545 A	< 5.0	0.71	< 15.	48.6	< 2.5
79546 A	< 5.0	0.61	< 15.	79.9	< 2.5
79547 A	< 5.0	0.62	< 15.	46.7	< 2.5

SAMPLE	BI	% CA	CD	CO	CR
79542 A	< 25.	4.90	< 2.5	8.5	24.
79543 A	< 25.	24.0	< 2.5	4.4	20.
79544 A	< 25.	2.33	< 2.5	7.7	8.0
79545 A	< 25.	1.19	< 2.5	7.7	8.0
79546 A	< 25.	12.4	< 2.5	7.4	26.
79547 A	< 25.	2.78	< 2.5	7.4	10.

SAMPLE	CU	% FE	K	LI	% MG
79542 A	31.	1.48	416.	< 20.	0.39
79543 A	22.	0.56	456.	< 20.	1.40
79544 A	12.	1.25	756.	< 20.	0.40
79545 A	13.	1.27	580.	< 20.	0.34
79546 A	27.	1.40	532.	< 20.	0.71
79547 A	16.	1.13	589.	< 20.	0.37

SAMPLE	MN	MO	NA	NI	P
79542 A	279.	< 5.0	2512	< 20.	719.
79543 A	492.	< 5.0	1627	34.	1452
79544 A	152.	< 5.0	1264	< 20.	568.
79545 A	152.	< 5.0	4885	< 20.	535.
79546 A	348.	< 5.0	4450	38.	899.
79547 A	166.	< 5.0	1438	< 20.	589.

SAMPLE	PB	SI	SN	SR	TI
79542 A	44.	-	< 25.	90.3	-
79543 A	76.	-	< 25.	269.	-
79544 A	< 25.	-	< 25.	59.2	-
79545 A	< 25.	-	< 25.	42.4	-
79546 A	86.	-	< 25.	137.	-
79547 A	< 25.	-	< 25.	52.3	-

SAMPLE	V	ZN	Hg (AAS)
79542 A	38.	60.8	16.
79543 A	40.	43.6	14.6
79544 A	36.	32.8	0.14
79545 A	36.	37.3	0.07
79546 A	50.	60.4	1.1
79547 A	35.	36.2	0.13

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EMISSION SPECTROGRAPHIC REPORT
MG PER MG, D.D. BASIS
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SAMPLE	AG	% AL	B	BA	BE
79548 A	< 5.0	0.53	< 15.	38.9	< 2.5
79549 A	< 5.0	0.67	< 15.	38.7	< 2.5
79550 A	< 5.0	2.57	< 15.	120.	< 2.5
79551 A	< 5.0	1.19	< 15.	114.	< 2.5
79552 A	< 5.0	0.90	< 15.	55.1	< 2.5
79553 A	< 5.0	0.58	< 15.	107.	< 2.5

SAMPLE	BI	% CA	CD	CO	CR
79548 A	< 25.	0.33	< 2.5	6.8	5.8
79549 A	< 25.	0.35	< 2.5	7.3	7.0
79550 A	< 25.	0.66	< 2.5	21.	26.
79551 A	< 25.	0.47	< 2.5	11.	11.
79552 A	< 25.	0.34	< 2.5	9.0	9.9
79553 A	< 25.	0.31	< 2.5	8.5	7.3

SAMPLE	CU	% FE	K	LI	% MG
79548 A	10.	1.02	465.	< 20.	0.33
79549 A	11.	1.13	506.	< 20.	0.33
79550 A	49.	3.51	433.	< 20.	0.73
79551 A	21.	1.72	410.	< 20.	0.42
79552 A	18.	1.30	416.	< 20.	0.32
79553 A	9.8	1.15	354.	< 20.	0.24

SAMPLE	MN	MO	NA	NI	P
79548 A	140.	< 5.0	1207	< 20.	548.
79549 A	147.	< 5.0	1404	< 20.	497.
79550 A	511.	< 5.0	723.	29.	655.
79551 A	228.	< 5.0	683.	< 20.	577.
79552 A	219.	< 5.0	1197	< 20.	492.
79553 A	206.	< 5.0	< 500.	< 20.	516.

SAMPLE	FW	SI	SN	SR	TI
79548 A	< 25.	-	< 25.	25.0	-
79549 A	< 25.	-	< 25.	29.0	-
79550 A	48.	-	< 25.	59.3	-
79551 A	< 25.	-	< 25.	44.2	-
79552 A	< 25.	-	< 25.	32.6	-
79553 A	< 25.	-	< 25.	27.4	-

SAMPLE	V	ZN	Hg (AAS)
79548 A	25.	30.6	0.08
79549 A	30.	34.0	< 0.05
79550 A	83.	61.1	1.1
79551 A	43.	46.0	1.6
79552 A	34.	41.1	0.72
79553 A	29.	53.5	0.90

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EMISSION SPECTROGRAPHIC REPORT
 MG PER AG, U.D. BASIS
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SAMPLE	AG	% AL	B	BA	BE
79554 A	< 5.0	1.24	< 15.	5029	< 2.5
79554 B	< 5.0	0.91	< 15.	3998	< 2.5

SAMPLE	BI	% CA	CD	CO	CR
79554 A	< 25.	0.55	< 2.5	15.	16.
79554 B	< 25.	0.42	< 2.5	10.	10.

SAMPLE	CU	% FE	HA	LI	% MG
79554 A	29.	1.91	635.	< 20.	0.46
79554 B	25.	1.48	531.	< 20.	0.35

SAMPLE	MN	MO	NA	NI	P
79554 A	328.	< 5.0	3687	< 20.	632.
79554 B	260.	< 5.0	2971	< 20.	577.

SAMPLE	FB	SI	SN	SR	TI
79554 A	32.	-	< 25.	157.	-
79554 B	< 25.	-	< 25.	121.	-

SAMPLE	V	ZN	Hg (AAS)
79554 A	44.	89.2	30.
79554 B	35.	69.0	23.

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Table IIIB

Longview Chloralkali Plant Study
 Mill Site Soil Samples
 EP-toxicity Metals (mg/L)

The Following Data Table is Arranged According to
 the Sample Designation Codes Outlined Below

<u>Sample Location</u>	<u>Sample Depth (ft)</u>	<u>Sample Code</u>
Site 1 - West Side Chloralkali Plant	2	79537
	5	79538
	7	79539
	10	79540
	14	79541
Site 2 - West Side Chloralkali Plant	2	79542
	5	79543
	9	79544
	15	79545
Site 3 - West Side Chloralkali Plant	2	79546
	5	79547
	9	79548
	14	79549
Site 4 - East Side Chloralkali Plant (Old Brine Pond Area)	2	79550
	5	79551
	10	79552
Site 5 - East Side Chloralkali Plant (Old Brine Pond Area)	2	79553
	5	79554

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LV Chlorine Plant
Soil Samples - EP Tox.

REPORT

Sample I.D.	Lab Code	Ag	As	Ba	Cd	Cr	Pb	Se	Hg		
		mg/L in Extract									
1	79537	<0.01	<0.1	0.4	<0.01	<0.01	<0.05	<0.1	<0.0002		
2	79538			1.1			0.09				
3	79539			0.7			<0.05				
4	79540			0.3							
5	79541			0.4							
6	79542			1.0			0.08				
7	79543			0.8			2.1				
8	79544			0.5			0.06				
9	79545			0.8			<0.05		0.0006		
10	79546			0.6			0.05		<0.0002		
11	79547			0.8			0.07				
12	79548			0.5			<0.05				
13	79549			0.6							
14	79550			0.6							
15	79551			0.5							
16	79552			0.4					0.0002		
17	79553			0.4					<0.0002		
18	79554			2.4					<0.0002		

Table IVA

Longview Chloralkali Plant Study
River Sediment Samples
Total Metals (mg/kg)

The Following Data Table is Arranged According to
the Sample Designation Codes Outlined Below

<u>Site Number</u>	<u>Sample Location</u>	<u>Sample Code</u>
1*	Kalama River Mouth	79573
2	Columbia River at Kalama	79574
3	Columbia River at Carrolls Island	79575
4	Cowlitz River Mouth	79576
5	Columbia River Below Rainier Bridge	79577
6	Columbia River at Mill Intake	79578
7	Columbia River Under Chlorine Plant Dock	79579
8	Columbia River 50 ft Off Chlorine Plant Dock	79580
9	Columbia River 30 ft Downstream of Plant Dock	79581
10	Columbia River at Oregon Side Opposite Mill	79582
11	Columbia River at Weyerhaeuser Boat Launch	79583
12	Columbia River 100 ft Off Boat Launch	79584
13	Columbia River at Barlow Point	79585
14	Columbia River at Fisher's Island	79586
15	Columbia River at Willow Grove	79587

***Note:** Analyses for metals were conducted on two separate aliquots from the site 1 sample. The mercury values detected may represent actual variation and non-homogeneity of sediment quality for these trace levels of mercury.

TABLE IV A - RIVER SEDIMENTS - TOTAL METALS

EMISSION SPECTROGRAPHIC REPORT MG PER KG, D.D. BASIS SR 13505

SAMPLE	AG	% AL	B	BA	BE
79573 A	< 5.0	0.25	15.	15.0	< 2.5
79573 B	< 5.0	0.39	< 15.	27.6	< 2.5
79574 A	< 5.0	0.84	< 15.	101.	< 2.5
79575 A	< 5.0	0.38	< 15.	32.5	< 2.5
79576 A	< 5.0	0.36	< 15.	7.25	< 2.5
79577 A	< 5.0	0.68	< 15.	35.8	< 2.5

SAMPLE	BI	% CA	CD	CO	CR
79573 A	< 25.	0.17	< 2.5	3.3	3.5
79573 B	< 25.	0.22	< 2.5	4.6	4.0
79574 A	< 25.	0.40	< 2.5	10.	12.
79575 A	< 25.	0.27	< 2.5	5.2	5.3
79576 A	< 25.	0.27	< 2.5	3.3	3.1
79577 A	< 25.	0.40	< 2.5	6.7	6.2

SAMPLE	CU	% FE	K	LI	% MG
79573 A	12.	0.53	124.	< 20.	0.18
79573 B	12.	0.67	137.	< 20.	0.28
79574 A	15.	1.39	669.	< 20.	0.38
79575 A	9.0	0.80	213.	< 20.	0.19
79576 A	11.	0.63	127.	< 20.	0.17
79577 A	26.	1.16	361.	< 20.	0.26

SAMPLE	MN	MO	NA	NI	P
79573 A	121.	< 5.0	< 500.	< 20.	410.
79573 B	117.	< 5.0	< 500.	< 20.	452.
79574 A	238.	< 5.0	< 500.	< 20.	621.
79575 A	160.	< 5.0	< 500.	< 20.	564.
79576 A	122.	< 5.0	< 500.	< 20.	466.
79577 A	245.	< 5.0	534.	< 20.	683.

SAMPLE	FB	SI	SN	SR	TI
79573 A	< 25.	-	< 25.	10.9	-
79573 B	< 25.	-	< 25.	21.8	-
79574 A	< 25.	-	< 25.	36.2	-
79575 A	< 25.	-	< 25.	17.7	-
79576 A	< 25.	-	< 25.	19.2	-
79577 A	< 25.	-	< 25.	30.5	-

SAMPLE	V	ZN	Hg (AAS)
79573 A	12.	8.61	0.26
79573 B	14.	10.6	< 0.05
79574 A	39.	63.3	< 0.05
79575 A	21.	32.5	0.13
79576 A	19.	12.0	< 0.05
79577 A	33.	40.4	< 0.05

Jeff Chilton
11-20-96

EMISSION SPECTROGRAPHIC REPORT
 MG PER MG, D.D. BASIS
 SR 13505

SAMPLE	AG	% AL	B	BA	BE
79578 A	< 5.0	0.56	< 15.	23.8	< 2.5
79579 A	< 5.0	0.40	< 15.	29.1	< 2.5
79580 A	< 5.0	1.56	< 15.	183.	< 2.5
79580 B	< 5.0	1.76	< 15.	187.	< 2.5
79581 A	< 5.0	0.50	< 15.	17.5	< 2.5
79582 A	< 5.0	0.72	< 15.	65.1	< 2.5

SAMPLE	BI	% CA	CD	CO	CR
79578 A	< 25.	0.36	< 2.5	4.8	5.3
79579 A	< 25.	0.28	< 2.5	4.7	3.9
79580 A	< 25.	0.79	< 2.5	18.	27.
79580 B	< 25.	0.78	< 2.5	18.	28.
79581 A	< 25.	0.29	< 2.5	5.1	6.7
79582 A	< 25.	0.34	< 2.5	8.8	10.

SAMPLE	CU	% FE	K	LI	% MG
79578 A	18.	1.05	205.	< 20.	0.21
79579 A	22.	0.79	210.	< 20.	0.19
79580 A	34.	2.07	925.	< 20.	0.61
79580 B	33.	2.23	1009	< 20.	0.64
79581 A	21.	0.86	260.	< 20.	0.21
79582 A	15.	1.27	596.	< 20.	0.31

SAMPLE	MN	MO	NA	NI	P
79578 A	142.	< 5.0	< 500.	< 20.	618.
79579 A	134.	< 5.0	< 500.	< 20.	593.
79580 A	278.	< 5.0	< 500.	23.	726.
79580 B	286.	< 5.0	< 500.	23.	727.
79581 A	93.2	< 5.0	5027	< 20.	593.
79582 A	296.	< 5.0	< 500.	< 20.	617.

SAMPLE	PB	SI	SN	SR	TI
79578 A	< 25.	-	< 25.	27.1	-
79579 A	< 25.	-	< 25.	19.0	-
79580 A	25.	-	< 25.	64.6	-
79580 B	< 25.	-	< 25.	66.0	-
79581 A	< 25.	-	< 25.	22.2	-
79582 A	< 25.	-	< 25.	30.7	-

SAMPLE	V	ZN	Hg (AAS)
79578 A	30.	25.8	0.06
79579 A	22.	23.7	0.14
79580 A	91.	72.8	0.15
79580 B	89.	75.3	0.15
79581 A	26.	29.5	0.73
79582 A	32.	71.0	< 0.05

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 3-20-86

EMISSION SPECTROGRAPHIC REPORT
MG PER KG, D.D. BASIS
SR 13505

SAMPLE	AG	% AL	B	BA	BE
79583 A	< 5.0	0.41	< 15.	31.4	< 2.5
79584 A	< 5.0	0.48	< 15.	32.0	< 2.5
79585 A	< 5.0	0.32	< 15.	22.3	< 2.5
79586 A	< 5.0	0.30	< 15.	21.7	< 2.5
79587 A	< 5.0	0.42	< 15.	46.9	< 2.5

SAMPLE	BI	% CA	CD	CO	CR
79583 A	< 25.	0.23	< 2.5	5.8	4.5
79584 A	< 25.	0.31	< 2.5	6.0	5.2
79585 A	< 25.	0.31	< 2.5	6.8	7.0
79586 A	< 25.	0.27	< 2.5	5.9	7.0
79587 A	< 25.	0.28	< 2.5	5.3	3.7

SAMPLE	CU	% FE	K	LI	% MG
79583 A	9.7	0.83	224.	< 20.	0.19
79584 A	8.9	1.02	213.	< 20.	0.28
79585 A	5.8	0.95	163.	< 20.	0.39
79586 A	14.	0.83	172.	< 20.	0.31
79587 A	7.5	0.79	207.	< 20.	0.17

SAMPLE	MN	MO	NA	N1	P
79583 A	127.	< 5.0	< 500.	< 20.	432.
79584 A	144.	< 5.0	< 500.	< 20.	555.
79585 A	134.	< 5.0	< 500.	21.	854.
79586 A	142.	< 5.0	< 500.	< 20.	718.
79587 A	351.	< 5.0	< 500.	< 20.	537.

SAMPLE	PB	SI	SN	SR	TI
79583 A	< 25.	-	< 25.	19.6	-
79584 A	< 25.	-	< 25.	23.2	-
79585 A	< 25.	-	< 25.	14.9	-
79586 A	< 25.	-	< 25.	12.6	-
79587 A	< 25.	-	< 25.	24.4	-

SAMPLE	V	ZN	Hg (AAS)
79583 A	21.	27.4	< 0.05
79584 A	27.	31.0	< 0.05
79585 A	27.	28.8	0.07
79586 A	23.	32.3	< 0.05
79587 A	17.	36.8	< 0.05

Jeff Chuter
3-20-86

Table IVB

Longview Chloralkali Plant Study
River Sediment Samples
EP-Toxicity Metals (mg/kg)

The Following Data Table is Arranged According to
the Sample Designation Codes Outlined Below

<u>Site Number</u>	<u>Sample Location</u>	<u>Sample Code</u>
1	Kalama River Mouth	79573
2	Columbia River at Kalama	79574
3	Columbia River at Carrolls Island	79575
4	Cowlitz River Mouth	79576
5	Columbia River Below Rainier Bridge	79577
6	Columbia River at Mill Intake	79578
7	Columbia River Under Chlorine Plant Dock	79579
8	Columbia River 50 ft Off Chlorine Plant Dock	79580
9	Columbia River 30 ft Downstream of Plant Dock	79581
10	Columbia River at Oregon Side Opposite Mill	79582
11	Columbia River at Weyerhaeuser Boat Launch	79583
12	Columbia River 100 ft Off Boat Launch	79584
13	Columbia River at Barlow Point	79585
14	Columbia River at Fisher's Island	79586
15	Columbia River at Willow Grove	79587

ANALYST

WEYERHAEUSER TECHNOLOGY CENTER
Analytical Laboratories
Tacoma, Washington

Service Request 13505

Page of

LV Chlorine Plant
River Sediment - EP Tox.

REPORT

Sample I.D.	Lab Code	Ag	As	Ba	Cd	Cr	Pb	Se	Hg		
		mg/L in Extract									
1	79573	<0.01	<0.1	0.3	<0.01	<0.01	<0.05	<0.1	<0.0002		
2	79574			0.4							
3	79575			0.5							
4	79576			<0.05							
5	79577			0.1							
6	79578			0.1							
7	79579			0.2							
8	79580			0.1							
9	79581			0.1							
10	79582			<0.05							
11	79583			<0.05							
12	79584			<0.05							
13	79585			<0.05							
14	79586			<0.05							
15	79587			<0.05					0.0004		

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Date 3-20-86

Page Notebook

Table V

Longview Chloralkali Plant Study
Groundwater Well Samples
Total Metals (mg/L)

Parameter	Sample Location	
	Chlorine Plant Well	Kraft Mill Well
Ag	<0.01	<0.01
Al	<0.02	<0.02
B	0.04	0.03
Ba	0.009	0.012
Be	<0.005	<0.005
Bi	<0.05	<0.05
Ca	24.2	19.0
Cd	<0.005	<0.005
Co	<0.005	<0.005
Cr	<0.005	<0.005
Cu	<0.01	<0.01
Fe	0.58	2.61
K	3.9	2.5
Li	<0.05	<0.05
Mg	7.67	5.99
Mn	0.56	0.004
Mo	<0.01	<0.01
Na	17.9	8.46
Ni	<0.04	<0.04
P	0.50	0.60
Pb	<0.05	<0.05
Sn	<0.05	<0.05
Sr	0.068	0.057
V	<0.005	<0.005
Zn	<0.005	<0.005
Hg	<0.0002	<0.0002

Table VI

Longview Chloralkali Plant Study
Fish Tissue Samples
Total Mercury and Zinc Analyses (mg/kg)
(Whole Fish Basis)

<u>Sample Location</u>	<u>Fish Type</u>	<u>Mercury</u>	<u>Zinc</u>
Kalama River Mouth	. River Sucker	0.03	23.4
Columbia River at Kalama River	. Flounder	0.04	26.9
	. Coho Smolt	0.03	30.8
	. River Sucker	<0.02	16.8
	. Stickleback	0.08	42.9
Cowlitz River Mouth	. Sculpin	0.06	24.1
	. Smelt	<0.02	9.4
Under Chlorine Plant Dock	. River Sucker	0.03	22.9
	. Sculpin	0.12	8.1
Downstream Edge of Chlorine Plant Dock	. Sculpin	0.04	10.6
Weyerhaeuser Boat Launch	. Sculpin	0.07	22.0
	. Flounder	0.03	24.8
	. Smelt	<0.02	10.4
	. Stickleback	<0.02	56.6
Willow Grove	. Coho Smolt	0.05	33.6
	. Smelt	<0.02	8.3
	. Flounder	0.03	24.1
	. Stickleback	0.04	47.8

Table VII

Longview Chloralkali Plant Study
Fish Tissue Samples
Total Metals Analyses (mg/kg)
(Whole Fish Basis)

The Following Data Table is Arranged According
to the Sample Designation Codes Outlined Below

<u>Sample Location</u>	<u>Fish Type</u>	<u>Sample Code</u>
Kalama River Mouth	. River Sucker	79519
Columbia River at Kalama River	. Flounder	79520
	. Coho Smolt	79521
	. River Sucker	79522
	. Stickleback	79523
Cowlitz River Mouth	. Sculpin	79524
	. Smelt	79525
Under Chlorine Plant Dock	. River Sucker	79526
	. Sculpin	79527
Downstream Edge of Chlorine Plant Dock	. Sculpin	79528
Weyerhaeuser Boat Launch	. Sculpin	79529
	. Flounder	79530
	. Smelt	79531
	. Stickleback	79532
Willow Grove	. Coho Smolt	79533
	. Smelt	79534
	. Flounder	79535
	. Stickleback	79536

EMISSION SPECTROGRAPHIC REPORT
 MG PER KG, AS REC'D HAN S
 SR 13501

SAMPLE	AG	AL	B	BA	BE
79519 A	< 1.0	15.9	< 3.0	1.6	< 0.5
79519 B	< 1.0	28.4	< 3.0	2.2	< 0.5
79520 A	< 1.0	7.58	< 3.0	5.6	< 0.5
79521 A	< 1.0	2.86	< 3.0	0.7	< 0.5
79522 A	< 1.0	26.1	< 3.0	2.0	< 0.5
79523 A	< 1.0	22.6	< 3.0	5.1	< 0.5

SAMPLE	BI	% CA	CD	CO	CR
79519 A	< 5.0	0.55	< 0.5	< 0.5	0.6
79519 B	< 5.0	0.83	< 0.5	< 0.5	0.6
79520 A	< 5.0	1.11	< 0.5	< 0.5	1.2
79521 A	< 5.0	0.65	< 0.5	< 0.5	1.0
79522 A	< 5.0	0.82	< 0.5	< 0.5	1.2
79523 A	< 5.0	2.07	< 0.5	< 0.5	0.9

SAMPLE	CU	FE	K	LI	MG
79519 A	1.5	35.9	3218	< 5.0	444.
79519 B	1.4	57.3	2959	< 5.0	530.
79520 A	6.4	15.5	2672	< 5.0	283.
79521 A	1.4	21.8	3406	< 5.0	346.
79522 A	< 1.0	37.6	2579	< 5.0	331.
79523 A	2.7	69.8	3013	< 5.0	559.

SAMPLE	MN	MO	NA	NI	% P
79519 A	1.8	0.0	806.	< 4.0	0.44
79519 B	2.6	0.1	775.	< 4.0	0.58
79520 A	5.9	0.2	1450	< 4.0	0.70
79521 A	1.5	0.2	1027	< 4.0	0.51
79522 A	3.7	0.3	543.	< 4.0	0.55
79523 A	13.	0.4	1841	< 4.0	1.25

SAMPLE	PB	SI	SN	SR	TI
79519 A	< 5.0	-	< 5.0	12.7	-
79519 B	< 5.0	-	< 5.0	18.0	-
79520 A	< 5.0	-	< 5.0	22.7	-
79521 A	< 5.0	-	< 5.0	9.54	-
79522 A	< 5.0	-	< 5.0	15.9	-
79523 A	< 5.0	-	< 5.0	36.5	-

SAMPLE	V	ZN	Hg (AAS)
79519 A	< 0.5	23.4	0.03
79519 B	< 0.5	22.4	0.03
79520 A	0.5	26.9	0.04
79521 A	< 0.5	30.8	0.03
79522 A	< 0.5	16.8	< 0.02
79523 A	< 0.5	42.9	0.08

Jeff Chilton
 3-20-86

EMISSION SPECTROGRAPHIC REPORT
MG PER KG, AS REC'D BY S
SR 13501

SAMPLE	AG	AL	B	BA	BE
79524 A	< 1.0	35.9	< 3.0	5.2	< 0.5
79525 A	< 1.0	12.6	< 3.0	< 0.5	< 0.5
79526 A	< 1.0	3.20	< 3.0	0.5	< 0.5
79527 A	< 1.0	5.16	< 3.0	1.2	< 0.5
79527 B	< 1.0	3.69	< 3.0	1.3	< 0.5
79528 A	< 1.0	5.02	< 3.0	2.2	< 0.5

SAMPLE	BI	% CA	CD	CO	CR
79524 A	< 5.0	1.03	< 0.5	< 0.5	0.6
79525 A	< 5.0	0.17	< 0.5	< 0.5	0.7
79526 A	< 5.0	0.44	< 0.5	< 0.5	0.5
79527 A	< 5.0	0.51	< 0.5	< 0.5	< 0.5
79527 B	< 5.0	0.59	< 0.5	< 0.5	< 0.5
79528 A	< 5.0	0.70	< 0.5	< 0.5	1.0

SAMPLE	CU	FE	K	LI	MG
79524 A	1.6	97.6	2490	< 5.0	348.
79525 A	1.2	50.8	1879	< 5.0	167.
79526 A	1.1	16.4	2802	< 5.0	274.
79527 A	< 1.0	12.4	1359	< 5.0	158.
79527 B	< 1.0	11.6	1200	< 5.0	171.
79528 A	< 1.0	16.5	2484	< 5.0	267.

SAMPLE	MN	MO	NA	NI	% P
79524 A	4.1	0.3	1013	< 4.0	0.64
79525 A	0.7	0.2	514.	< 4.0	0.21
79526 A	1.0	0.1	927.	< 4.0	0.37
79527 A	< 0.5	0.0	889.	< 4.0	0.33
79527 B	< 0.5	0.0	808.	< 4.0	0.36
79528 A	0.6	0.0	1270	< 4.0	0.49

SAMPLE	PB	SI	SN	SR	TI
79524 A	< 5.0	-	< 5.0	19.8	-
79525 A	< 5.0	-	< 5.0	13.9	-
79526 A	< 5.0	-	< 5.0	30.4	-
79527 A	< 5.0	-	< 5.0	12.8	-
79527 B	< 5.0	-	< 5.0	13.8	-
79528 A	< 5.0	-	< 5.0	19.6	-

SAMPLE	V	ZN	Hg (AAS)
79524 A	< 0.5	24.1	0.06
79525 A	< 0.5	9.43	0.02
79526 A	< 0.5	22.9	0.03
79527 A	< 0.5	7.24	0.11
79527 B	< 0.5	8.14	0.12
79528 A	< 0.5	10.6	0.04

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3-20-86

EMISSION SPECTROGRAPHIC REPORT
MG PER KG, AS REC'D BY IS
SR 13501

SAMPLE	AG	AL	B	BA	BE
79529 A	< 1.0	3.77	< 3.0	4.1	< 0.5
79530 A	< 1.0	4.82	< 3.0	4.8	< 0.5
79531 A	< 1.0	11.7	< 3.0	< 0.5	< 0.5
79532 A	< 1.0	30.4	< 3.0	5.9	< 0.5
79533 A	< 1.0	2.98	< 3.0	< 0.5	< 0.5
79534 A	< 1.0	3.68	< 3.0	< 0.5	< 0.5

SAMPLE	BI	% CA	CD	CO	CR
79529 A	< 5.0	1.03	< 0.5	< 0.5	1.0
79530 A	< 5.0	1.10	< 0.5	< 0.5	1.7
79531 A	< 5.0	0.13	< 0.5	< 0.5	0.5
79532 A	< 5.0	2.80	< 0.5	< 0.5	1.2
79533 A	< 5.0	0.48	< 0.5	< 0.5	1.6
79534 A	< 5.0	0.23	< 0.5	< 0.5	< 0.5

SAMPLE	CU	FE	K	LI	MG
79529 A	< 1.0	13.8	2384	< 5.0	329.
79530 A	1.0	19.1	2942	< 5.0	320.
79531 A	1.7	38.2	2338	< 5.0	183.
79532 A	2.1	35.4	2387	< 5.0	650.
79533 A	1.2	20.7	3254	< 5.0	266.
79534 A	1.2	20.2	2099	< 5.0	188.

SAMPLE	MN	MO	NA	NI	% P
79529 A	6.6	0.1	1033	< 4.0	0.67
79530 A	6.0	0.2	1378	< 4.0	0.71
79531 A	1.1	0.2	653.	< 4.0	0.21
79532 A	18.	0.4	1478	< 4.0	1.64
79533 A	0.7	0.0	991.	< 4.0	0.38
79534 A	< 0.5	0.2	548.	< 4.0	0.25

SAMPLE	PB	SI	SN	SR	TI
79529 A	< 5.0	-	< 5.0	20.0	-
79530 A	< 5.0	-	< 5.0	19.1	-
79531 A	< 5.0	-	< 5.0	8.95	-
79532 A	< 5.0	-	< 5.0	44.6	-
79533 A	< 5.0	-	< 5.0	8.35	-
79534 A	< 5.0	-	< 5.0	16.6	-

SAMPLE	V	ZN	Hg (AAS)
79529 A	< 0.5	22.0	0.07
79530 A	< 0.5	24.8	0.03
79531 A	< 0.5	10.4	0.02
79532 A	0.5	56.6	0.02
79533 A	< 0.5	33.6	0.05
79534 A	< 0.5	8.31	0.02

Jeff Chute
3-20-86

EMISSION SPECTROGRAPHIC REPORT
 MG PER KG, AS REC'D
 SR 13501

SAMPLE	AG	AL	B	BA	BE
79535 A	< 1.0	5.24	< 3.0	5.2	< 0.5
79536 A	< 1.0	25.7	< 3.0	3.7	< 0.5
79536 B	< 1.0	19.1	< 3.0	4.0	< 0.5

SAMPLE	BI	% CA	CD	CO	CR
79535 A	< 5.0	1.42	< 0.5	< 0.5	2.1
79536 A	< 5.0	2.28	< 0.5	< 0.5	1.2
79536 B	< 5.0	2.30	< 0.5	< 0.5	1.1

SAMPLE	CU	FE	K	LI	MG
79535 A	< 1.0	22.3	2558	< 5.0	334.
79536 A	2.5	49.0	2263	< 5.0	531.
79536 B	2.8	29.7	2499	< 5.0	544.

SAMPLE	MN	MO	NA	NI	% P
79535 A	13.	0.3	1575	< 4.0	0.86
79536 A	17.	0.1	1281	< 4.0	1.38
79536 B	16.	0.0	1359	< 4.0	1.41

SAMPLE	PB	SI	SN	SR	TI
79535 A	< 5.0	-	< 5.0	25.7	-
79536 A	< 5.0	-	< 5.0	33.9	-
79536 B	< 5.0	-	< 5.0	34.9	-

SAMPLE	V	ZN	Hg (AAS)
79535 A	0.5	24.1	0.03
79536 A	0.5	47.7	0.04
79536 B	0.5	47.8	0.03

T. J. Clark
 3-20-86

Appendix VIII

Well Logs for Chloralkal Plant Wells



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

M E M O R A N D U M

October 27, 1986

TO: Weyerhaeuser Chlor-Alkali Plant Files
FORM: Michael J. Spencer *mjs*
SUBJECT: Phase I Site Inspection

During the morning of Tuesday, September 30, 1986, I conducted a PA/SI Phase I site inspection of the Weyerhaeuser Chlor-Alkali Plant.

Met at facility in Longview - 10 a.m. with Bob Anderson - Tacoma Office Env. Affairs; Jim Fisher - Aquatic Toxicologist; Don Work - Eng. & Tech. Supt. - Longview.

Went over Jim's report - I pointed out what I felt were several "discrepancies". We discussed these and he will get a revised report to me ASAP.

11:45 - Went out on site.

Weather - overcast, light misty rain, no wind, 50°F

Went first to SE corner of the "west" site, in vicinity (north of) of the two production wells.

First sample Weyco took (2 on map) was approx. 25' N of telephone pole; 3 on map was 50' further, and 3rd sample (No. 1 on map) was at base of rubble to right (in photo). Looking to the west.

Salt pile - site was paved parking lot. Water sprayed on, get salt brine, pumps into production unit from a sump. Is an "emergency" supply source. The new project facility Weyco is planning will be on the area where samples 1, 2, 3 were collected. They wouldn't go into details about what it would be.

They took samples where thought (recollection) was dumped some of the contaminated material from the east site (brine ponds cleanup).

Used backhoe to dig down, taking samples from different depths as could visually interpret different layers.

Some, or most, of chloralkali waste goes out pulp mill effluent pipe line into Columbia River, has current NPDES permit.

When uses the salt (from Mexico) - sodium hydroxide and sodium carbonate are added to remove impurities (Ca, Mg).

The "east" site is fenced in - we went around south end of fence, along river's edge.

Saw where Weyerhaeuser samples 4 and 5 were collected. Brine ponds were constructed on top of bedrock. This runs along in area. (Samples were able to be taken down to only 10' at 4 and 5' at 5. Sampled areas have lumber stacked on top of now.

Saw Army Corp. of Engineers dredging along near bank during time of SI.

Building of west of east site is where mercury cells were located and used during 1955-67/68.

Sample 4 was over middle area of the river-most brine pond. Hoped was the "worse" case situation. (They) felt this was the best way to sample - take the ones they did, and if showed anything - go back and do more comprehensive study. Found zero values of EP Tox for mercury at all sites.

Values from river water and sediment showed no significant migration of mercury occurred offsite.

To the south of the old cell building, and east of salt dock, is a building where paper rolls get edges cut. Needs to be very stable situation, so built here on bedrock.

Finished east site inspection at 12:20.

MJS/drm

Tape Transcription - Weyerhaeuser Chlor-Alkali Plant Phase I SI, 9/30/86

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10/86MS/drm

Comments on Weyco's "Assessment of the Environmental Effects
of Residual Mercury near the Longview Chloralkali Plant"

George Houck 8/7/86

- ① Because a table was not provided that showed how the soil sampling results varied with depth (a surprising oversight) I compiled the attached handwritten table. It shows that at site 5 (east side) there was:

0.90 ppm Hg - 2 ft down

30 ppm Hg - 5 ft down

This ~~information~~ suggests that they should take samples deeper at this site #5. In the meeting, ~~Mr.~~ Mr. Fisher said the eastern side was overlain by 2 ft of clay.

- ② The river sediment samples were only taken on the surface of the river bed. Fisher explained that to dig deeper was too difficult in the strong current.
- ③ The map should have the brine ponds superimposed ~~so~~ so we can see their location vs. sites 4, & 5.

Weyco Results

Soil Sampling Results

<u>site 1</u>	<u>depth</u>	<u>concentration</u>
<u>West</u>	2' -	12 mg/kg
	5' -	1.3 mg/kg
	7' -	0.35
	10' -	0.10
	14' -	< 0.05 mg/kg

<u>West site 2</u>	<u>depth</u>	<u>concentration</u>
	2' -	16 mg/kg
	5' -	9.6
	9' -	0.4
	15' -	0.07

<u>West site 3</u>	<u>depth</u>	<u>concentration</u>
	2' -	1.1 mg/kg
	5' -	0.13
	9' -	0.08
	14' -	< 0.05

<u>East site 4</u>	<u>depth</u>	<u>concentration</u>
	2' -	1.1
	5' -	1.6
	10' -	0.72

<u>East site 5</u>	<u>depth</u>	<u>concentration</u>
	2' -	0.90
	5' -	(30) (23)

Was right at bedrock

ANDREA BEATTY RINKER
Director



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

M E M O R A N D U M

August 11, 1986

TO: Emily Ray
FROM: George C. Houck *George C Houck*
SUBJECT: Weyerhaeuser Chlor-Alkali Plant, Longview (WA D009041450)

Dick Burkhalter suggested I write this memo to you. It concerns the potential hazardous waste site at Weyerhaeuser's Chlor-Alkali Plant in Longview. This site was given a medium priority in a preliminary assessment completed by Suzanne Milham on January 22, 1985.

The purpose of the memo is to share an understanding that Suzanne and I reached, and also to request that the site inspection be accomplished as soon as possible.

Because of an uncertainty over roles, Weyerhaeuser staff (Bob Anderson, Ken Johnson, and Jim Fisher) held a meeting July 16, with myself and Dick Burkhalter, ~~concerning~~ concerning this site. They submitted a report entitled "Assessment of the Environmental Effects of Residual Mercury near the Longview Chlor-Alkali Plant." I have since given Suzanne a copy of the report.

My understanding with Suzanne is that your section will perform the site inspection and submit the completed inspection report to EPA. This of course includes a review of the Weyerhaeuser report. I will provide consultation and will perhaps have an involvement at later stages, depending on the inspection report's findings.

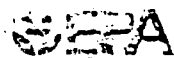
Emily Ray
August 11, 1986
Page Two

The Weyerhaeuser Company is anxious to construct buildings and paving at the western part of the site. This is immediately adjacent to the chlor-alkali plant which was rebuilt as a diaphragm cell process (from the earlier mercury cell process) in the early 1970's. We request that the inspection and review be conducted as expeditiously as possible, for the reason above.

I will share with Suzanne (or Mike Spencer) the information we gathered at the July 16 meeting.

GCH:aa

cc: Bob Kievit
Suzanne Milham
Dick Burkhalter



Notification of Hazardous Waste Site

United States
Environmental Protection
Agency
Washington DC 20460

This initial notification information is required by Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9, 1981.

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies.

2505

JUN 1 1982

WAS 000001232

Amended

EPA # WAD009041450

~~6-11-82~~ 82-06-14

Some information

A Person Required to Notify:

Enter the name and address of the person or organization required to notify.

Name WEYERHAEUSER COMPANY

Street P.O. Box 188

City LONGVIEW

State WASH

Zip Code 98632

B Site Location:

Enter the common name (if known) and actual location of the site.

Name of Site CHLOR-ALKALI PLANT - WEYERHAEUSER MILLSITE

Street INDUSTRIAL WAY

City LONGVIEW

County Cowlitz

State WASH

Zip Code 98632

C Person to Contact:

Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title) KEN JOHNSON - REGION ENVIRONMENTAL ENGINEER

Phone (206) 425-2150

D Dates of Waste Handling:

Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year) 1956

To (Year) 1974

E Waste Type: Choose the option you prefer to complete

Option 1: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste:

Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☐ Organics
2. ☐ Inorganics
3. ☐ Solvents
4. ☐ Pesticides
5. ☒ Heavy metals
6. ☐ Acids
7. ☐ Bases
8. ☐ PCBs
9. ☐ Mixed Municipal Waste
10. ☐ Unknown
11. ☐ Other (Specify)

Source of Waste:

Place an X in the appropriate boxes.

1. ☐ Mining
2. ☐ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron/Steel Foundry
8. ☒ Chemical, General
9. ☐ Plating/Polishing
10. ☐ Military/Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☐ Sanitary/Refuse
15. ☐ Photofinish
16. ☐ Lab/Hospital
17. ☐ Unknown
18. ☐ Other (Specify)

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 3001 regulations (40 CFR Part 261).

Specific Type of Waste:

EPA has assigned a four-digit number to each hazardous waste listed in the regulations under Section 3001 of RCRA. Enter the appropriate four-digit number in the boxes provided. A copy of the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site is located.

D009

Notification of Hazardous Waste Site

Side Two

F Waste Quantity:

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☒ Landfill
4. ☐ Tanks
5. ☐ Impoundment
6. ☐ Underground Injection
7. ☐ Drums, Above Ground
8. ☐ Drums, Below Ground
9. ☐ Other (Specify) _____

Total Facility Waste Amount

~~cubic feet~~ 2,000 cu. yds. (Y)

gallons _____

Total Facility Area

square feet 45,000 ft² (S)

acres _____

G Known, Suspected or Likely Releases to the Environment:

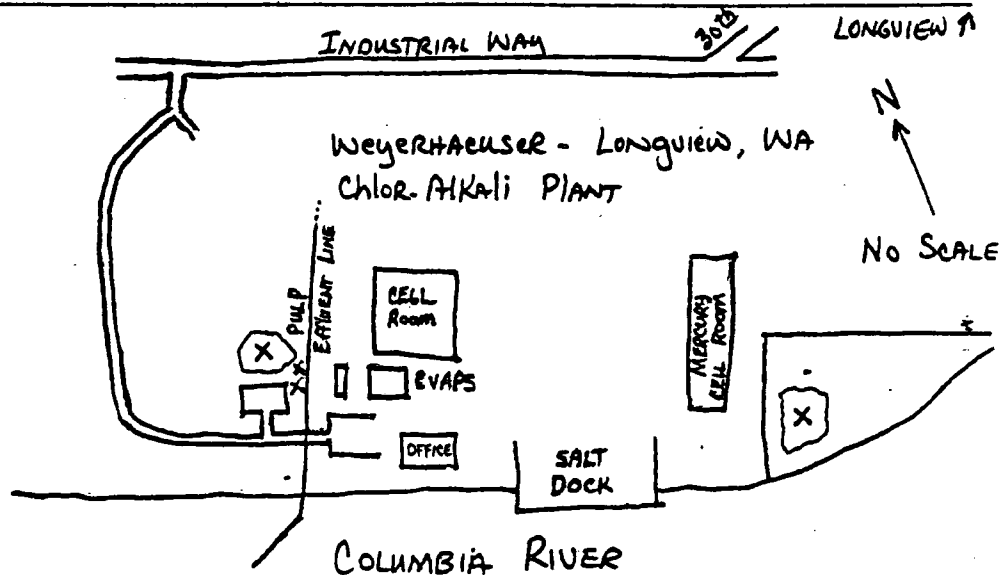
Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment.

☐ Known ☒ Suspected ☐ Likely ☐ None

Note: Items Hand I are optional. Completing these items will assist EPA and State and local governments in locating and assessing hazardous waste sites. Although completing the items is not required, you are encouraged to do so.

H Sketch Map of Site Location: (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publishing map showing the site location.



I Description of Site: (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

Mercury cells were utilized in the production process from 1956-74. Periodic maintenance and cell replacement produced a variety of waste materials having a very slight mercury contamination. As these materials were generated, they were piled in two areas adjacent to the production operations (see locations on map above) and subsequently covered over with river dredge spoils. Two wells, supplying water for process use only, are located adjacent to the westernmost disposal site.

J Signature and Title:

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification, the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required to notify check "Other".

Name

Tom Steiner

Street

Weyerhaeuser Co, P.O. Box 188

City

Longview

State

WA

Zip Code

98632

Signature

Tom Steiner

Date

5/4/82

☒ Owner, Present

☒ Owner, Past

☐ Transporter

☒ Operator, Present

☒ Operator, Past

☐ Other

HAZARDOUS WASTE INFORMATION

General Type		Source of Waste	
<input type="checkbox"/> Organics		<input type="checkbox"/> Mining	<input type="checkbox"/> Transformers
<input type="checkbox"/> Inorganics		<input type="checkbox"/> Construction	<input type="checkbox"/> Utility Companies
<input type="checkbox"/> Solvents		<input type="checkbox"/> Textiles	<input type="checkbox"/> Sanitary/Refuse
<input type="checkbox"/> Pesticides		<input type="checkbox"/> Fertilizer	<input type="checkbox"/> Photofinish
<input checked="" type="checkbox"/> Heavy Metals		<input type="checkbox"/> Paper/Printing	<input type="checkbox"/> Lab/Hospital
<input type="checkbox"/> Acids		<input type="checkbox"/> Leather Tanning	<input type="checkbox"/> Unknown
<input type="checkbox"/> Bases		<input type="checkbox"/> Iron/Steel Foundry	<input type="checkbox"/> Other:
<input type="checkbox"/> PCB	<input checked="" type="checkbox"/>	<input type="checkbox"/> Chemical, General	
<input type="checkbox"/> Municipal Waste		<input type="checkbox"/> Plating/Polishing	
<input type="checkbox"/> Unknown		<input type="checkbox"/> Military/Ammunition	
<input type="checkbox"/> Other:		<input type="checkbox"/> Electrical Conductors	

Period of disposal, from: 1957 to: present (mercury 1975)

Material	Toxicity	Persistence	Physical State	Quantity (1)	Facility Type (2)	Containment (3)
asbestos	2 mod	3	solid/ sludge	9 tons/year	drums	good

- (1) gallons-cubic yards-tons. (3) none-leaking-good-unknown
 (2) piles-land treatment-landfill-tanks-impoundment-underground injection-
 drums, above ground-drums, below ground-other

◀ POTENTIAL HAZARD RANKING SYSTEM SCORE ▶

Groundwater/Surface Water Route			Air Route		
Hazardous Waste Quantity:	1		Waste Characteristics:		
0 ① 2 3 4 5 6 7 8			Reactivity/Incompatibility		
			0 1 2 3		
Toxicity/Persistence	15		Toxicity		
0 3 6 9 12 ⑮ 18			0 1 2 3 (X3)		
Hazardous Waste Quantity			Hazardous Waste Quantity		
0 1 2 3 4 5 6 7 8			0 1 2 3 4 5 6 7 8		
Potential Score	10 / 26 X 100 = 61.70		Potential Score		/ 20 X 100 =

◀ EVENTS ▶

Event	Date Started	Date Completed	Conducted By				Count
			EPA	State	Resp. Party	Other	
Site Discovery		79/07					
Preliminary Assessment		79/07					
Site Investigation	79/08	79/08	X	X			
Remedial Action	/	/					
Removal Action	/	/					
Enforcement Investiga.	/	/					
Administrative Order	/	/					
Judicial Action	/	/					

◀ DATA/INFORMATION AVAILABLE IN FILE ▶

Type of Data/Information	Yes	No	Attached
Groundwater Analyses			
Surface Water Analyses			
Air Quality Analyses			
Location Map			
Site Plan	X		
Well Logs			
Soil Type			

Additional comments and information:

DRAFT

OF

ENVIRONMENTAL IMPACT INFORMATION

FOR THE

CONVERSION OF THE CHLOR-ALKALI PLANT

FROM THE

MERCURY CELL TO THE DIAPHRAGM CELL PROCESS

WEYERHAEUSER COMPANY
LONGVIEW, WASHINGTON

CONTENTS

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D. Noise	8
E. Energy Requirements	8
F. Employment	8
G. Taxes	8
H. Transportation	9
I. Aesthetics	9
IV. Summary	

Maps showing new & old

DRAFT

1. Background

In 1956 Weyerhaeuser Company constructed a chlor-alkali plant at Longview, Washington, located on the Columbia River immediately west of its pulp mill. The decision to enter this business was influenced by the rapidly expanding pulping industry in the northwest and the necessity to assure our mills of an adequate supply of these vital process chemicals.

Two electrochemical processes were available then, as now, for the manufacture of chlorine and caustic. One used a mercury cell, the other a diaphragm cell. The mercury cell process was newer, more efficient from the standpoint of total energy use and produced a purer caustic. The mercury cell also produced a 50% caustic soda solution directly. The diaphragm cell required an evaporation stage to reduce the salt and water content of the cell product. Since much of the production would be shipped, the weight of water in the product was a very important cost item. Economics clearly favored the mercury cell process at that time.

We were well aware of the health hazards of working with mercury. It was known that inhalation of mercury vapor and contact of metallic mercury with the skin should be avoided. Also certain compounds were quite toxic and others appeared completely innocuous, as the medical profession recognized. A program of testing the mercury content of employees' urine was instituted. This was all prior to any awareness by anyone that mercury could have a potential as a toxicant in the general environment. It has since been demonstrated that anaerobic bacteria can provide the mechanism of forming methylmercury from metallic mercury. In such form it can be absorbed in the metabolic process of aquatic animal.

In 1967 the size of the operation was increased, creating two separate units with the capability of producing 265 tons of chlorine per day.

Mercury is lost to the atmosphere, the water and is present in the solid wastes generated in the process. Increasingly stringent standards are being imposed. OSHA has set very tight requirements. EPA has expressed the objective of ultimately requiring zero discharges of mercury. Hence, Weyerhaeuser Company has made the difficult decision to convert the operation to a diaphragm cell process and thus eliminate the use of mercury. The company has applied for and received from EPA a waiver of compliance on the new mercury air quality standards of the "National Emission Standards for Hazardous Air Pollutants." This waiver expires March 31, 1975.

11. Proposed Process and Plant Changes

An increase in plant capacity from the present 265 tons/day to 385 tons/day is planned. It is hoped that this will return some of the heavy capital outlay for the process conversion. The total project cost will be in excess of \$16M².

The electrolytic decomposition of a solution of common salt produces chlorine gas and caustic soda. The products must be continuously removed from the cell as they are formed. The chlorine leaving as a gas will be treated much the same as in the present plant. It will be cooled, compressed, liquefied and shipped by rail cars. In the existing operation residual chlorine in the non-condensable gases has been absorbed in caustic to generate sodium hypochlorite to be used for bleaching in the pulp mill. Mill requirements have been more than the amount of chlorine available in these gases. The enlarged plant will affect this balance. The excess, which cannot be thus used locally, will be recovered as marketable chlorine by reinstituting use of a carbon tetrachloride chloride absorption system available on the site.

The major change in the whole system is the substitution of diaphragm type steel cathode cells for the present mercury cathode cells. The new cells are prepared for service on site by forming an asbestos coating over the steel cathodes screens. This asbestos coating forms the barrier which allows separation and removal of the caustic soda formed from the brine solution.

As before, hydrogen gas is produced with the caustic soda. This gas will be piped or vented to one of the power boilers on the manufacturing complex site to be burned for its heat value. Vented hydrogen is hot and wet and will cause a visible water vapor plume.

The new process will require evaporation to concentrate the caustic soda to a 50% solution.

This will be accomplished by installing multiple effect evaporators. These are made of nickel and are the most expensive items in the project. Cooling of the chlorine gas requires removal of large amounts of heat.

The necessary removal of large amounts of heat from the chlorine handling system is accomplished by non-contact water heat exchangers. The increased size of the operation will generate more heat. Further there will be water to condense from the caustic evaporators. The major heat load from the whole operation will ^{be} handled by an evaporative cooling tower.

Salt as the raw material for this process is received by ship or rail. It is planned to increase the size of the existing storage area. The necessary permits for this work have already been received.

*- what permits for what changes
moving salt off dock*

TABLE 1

A. EFFLUENTS DISCHARGED TO COLUMBIA RIVER

Effluent	Present	Estimated Mid 1975
1. Flow, M ² GPD (ave.)	6.4	4.5
2. Chlorine	(see note 2)	(same)
3. Mercury, lbs/day	0.4	Trace
4. pH	6.0 - 8.5	6.0 - 8.5
5. Temperature	(see Note. 5)	(same)
6. Asbestos	Not used	Trace

1. The flow given in the "present" column of Table 1 is an average value. The major amount of water used in the plant is solely for cooling purposes. The actual volume required varies with the temperature of the incoming supply.
2. The average chlorine concentration in the effluent, including any contributions from the chlorine plant's sodium hypochlorite manufacturing system, is less than the concentration from the filter plant, but the effluent averages 140 lb/day.
3. Mercury loss of 0.2 lbs/day/plant has been achieved through improvements over the last two and one-half years and meets the present state requirements. Our present NPDES permit requires that 0.1 lbs/day/plant be achieved by 1976.
4. pH of effluents discharged will be controlled within the 6.0 to 8.5 limits as required by our permit.
5. There is no significant temperature increase outside the dilution zone.
6. Coarse fibrous asbestos, used in electrode preparation and maintenance, will be handled in a closed water system.

B.

TABLE 11

EMISSIONS DISCHARGED TO THE ATMOSPHERE

Emissions	Present	Estimated Mid 1975
1. Asbestos	No visible	No visible
2. Hydrogen tons/day	7.7	10.5 (or burned)
3. Mercury, lbs/day	22	Trace
4. Odor:		
Chlorine	Detectable at times	Detectable at times
Carbon Tetrachloride	Negligible	Detectable
5. Visible	Water vapor only.	Water vapor only

1. Asbestos, used in the preparation of the diaphragms, will arrive in the dry form in bags. It will be used as a water slurry to coat the cathodes. New or modern methods of handling this material can meet OSHA standards.
2. Hydrogen gas is a by-product in a chlor-alkali plant. In the present operation this is vented to the atmosphere. The 10.5 tons/day from the enlarged operation may be piped to one of the power boilers elsewhere in the manufacturing complex and burned to recover its fuel value. Alternative uses of this material are being investigated.
3. Tests on the emissions of mercury to the atmosphere have indicated that about 22 lbs/day are lost. OSHA standards necessitate high air flows for ventilation. Treating these large air volumes in any way to try to meet other agencies' requirements is extremely difficult. These incompatibilities or trade-offs strongly influenced the company's decision to convert the plant to a non-mercury operation.

B. TABLE 11 - Cont'd

4. The only odorous materials which could escape to the atmosphere are chlorine and carbon tetrachloride. About 15 lbs/day of chlorine may be lost. This may, at times, reach the limit of detection or about that experienced around a chlorinated swimming pool. The majority of the chlorine in the tail gases from the chlorine liquefaction stage will still be used for making sodium hypochlorite for the pulp mill. Carbon tetrachloride will be used as an absorbent for recovering chlorine gas remaining after the above step. Although the carbon tetrachloride is chilled when used as an absorbent, a detectable odor may be present in the discharged gas stream. The nearest public road is located 2, 500 feet east of the plant. Odor should present no problem.

TABLE 111

SOLID WASTES

Solid Waste	Present	Estimated Mid 1975
1. Salt sludge, tons/day	4	6
2. Mercury	5 lbs/day	Trace after cleanup
3. Asbestos, tons/year	None used	<u>Less than 9, normal operation</u>

1. The raw material, common salt, is produced by solar evaporation of sea water or the waters of Great Salt Lake, Utah. Impurities, such as the salts of magnesium, calcium, iron, etc. must be removed. This is accomplished by adding precipitants, flocculants, etc. The resulting sludge is a solid waste. *water site*
2. Fresh salt is first dissolved with recycled brine containing some mercury. *3/4 Barium sulfate 3 tons/day*
Thus, the present brine sludge also becomes contaminated. It is disposed of in a DOE *spell out* approved site. Following the transition of manufacture to the diaphragm cells, mercury contamination of these sludges will cease. Thereafter the sludge will present only ordinary solid waste disposal problems for innocuous materials. *proposal to handle?*
3. A small amount of solid waste, classed as hazardous material, will be the discarded asbestos from the diaphragms. It is necessary to keep this material wet or covered to prevent its becoming airborne by winds. Ultimate disposal will be by burial in approved sites. *Handling, transportation, etc.?*

D. Noise

The low noise level from the existing plant will not be increased.

Is it acceptable?

E. Energy Requirements

1. Electrical

The existing PUD substation will require three items: a 30 MVA-230/13.8 KV transformer, a zigzag grounding transformer and a 2500 KVA voltage regulator. The 30 MVA transformer is presently in the substation and only requires being moved and connected. The zigzag grounding bank will be supplied by the Bonneville Power Administration. The voltage regulator will be purchased by Weyerhaeuser Company. Power requirements will change from about 44 to 50 Megawatts/day, DC. No additional power lines to the mill will be required.

The contract for additional power requirements has already been secured.

2. Steam

The steam demand will increase to about 150,000#/hr. from caustic evaporator requirements and will be met from the pulp mill powerhouse complex.

Impact?

F. Employment

There will be essentially no change in the number of employees at the plant. Some will require job training because of the new system.

In a tightening energy situation with forecasts of continuing shortages of chlorine and caustic, this plant's increased production will help assure continued operation of our mills and others in the industry. To this extent employment will be steadier.

G. Community Benefits

Increased property taxes and other financial benefits will result to the community from this manufacturing conversion.

H. Transportation

Salt will probably be delivered by ships which are self-loading vessels.

Chlorine and caustic shipments by rail or truck will more than double. Some *Impact* additional tank storage will be required on site to provide surge capacity.

1. Aesthetics

The consolidation of the two existing plants into one operation will present a more pleasing aspect. This will be especially true from the waterside following planned changes in the dock and salt storage area. Unused equipment will be dismantled. Plant will continue to be well maintained.

IV

Summary

1. The manufacturing process will change from the mercury cell to the diaphragm cell, thus eliminating mercury as an element of environmental concern.
2. The plant capacity will increase 45%.
3. The energy requirements will increase 20%.
4. There will be an increase in truck, rail and water transportation.
5. The total project will cost in excess of \$16M².
6. There will be no change in raw materials.
7. There will be no change in the products or their character.
8. Liquid effluents will be similar to or less than present, both in volume and chemicals of concern.
9. Gaseous emissions will continue to be low. At times a visible water vapor plume may be evident.
10. There will be some increase in solid wastes but toxicity will be decreased.
11. There will be no change in employment.

EVALUATION

The plant manufactures chlorine, caustic and hydrochloric acid. Current waste streams consist of:

1. Leaks and spills from electrolytic cells
2. Barometric condenser water containing carry over from the caustic evaporation process
3. Scrubber water
4. Contact chlorine cooling water
5. Spillage from the acid plant
6. Salt sludge
7. Tank car and cylinder wash water
8. Non-contact cooling water

Currently, the mercury contaminated waste stream is treated with ferrous sulfate before discharge and the resultant sludge is trucked to Eastern Washington for disposal. The new sludge drying equipment has not been installed due to equipment delays and mechanical problems, so an extension for compliance has been granted to September, 1974. The plant has had a history of permit violations, most of which have been of very short duration.

The plant will switch from mercury cells to diaphragm cells in two steps. The first step is tentatively set for January 31, 1975 and Step 2 for March 31, 1975. Step 2 will also see the demolition of the old mercury cells. The conversion will include a plant capacity increase of 45%, concurrent with a one-third reduction of effluent flow. Effluent from the chlorine residual stripper will be recycled (a major contributor to permit violations). The pH problems will be reduced by curbing and sumps plus treatment (another major contributor to permit violations).

Effluent Limitations

Flow--NPDES permit #3450 and new application.

Temperature--NPDES permit #3450 and new application

Interim Chlorine Residual--NPDES permit #3450 and new application

Final Chlorine Residual--arbitrary lowered due to improved chlorine residual recovery and a review of current discharge levels, and published research on the toxicity of chlorine.

pH--NPDES permit #3450

TSS--~~average set by concentration expected (in new application), maximum 2 times average as per Federal guidelines.~~

Zinc and Nickel--based on application and toxicity levels cited in Water Quality

Criteria, McKee and Wolf, 1963. The metals are to be monitored to assess the quantity being discharged. If the levels are insignificant, the monitoring will be discontinued.

Cooling tower blowdown will either be recycled or treated to meet effluent concentration.

A preliminary engineering report for meeting 1983 guidelines (no discharge) is required by July 1, 1979.

A plan and schedule for recovery of mercury and disposal of the mercury contaminated parts of the mercury cell process is required by July 1, 1975.

An engineering report to meet the chlorine residual reduction is required by December 31,

FACT SHEET - TECHNICAL INFORMATION

chlorine production
will be 385T/day
after plant conversion

The applicant produces chlorine, caustic soda and hydrochloric acid. The discharge is composed of cooling water, barometric condenser water and other process water. Presently, temperature, pH, chlorine residual and mercury are the parameters significantly effecting the water quality of the waste stream. Following completion of the plant conversion, mercury will not be a significant discharge. Zinc, and nickel are present. The discharge is via two submerged outfalls into the Columbia River.

1. Description of Discharge

According to monthly reports, pH ranges from 2.3 to 12.8 with the majority of the values between 6 - 8.5. The temperature ranges from 50 to 80°F (winter) and 75 to 98°F (summer). The chlorine residual is usually less than 5 mg/l, although values in excess of 14 mg/l have occurred for limited times. Present metal discharge is only mercury at less than 30 ppb. After plant conversion, mercury discharge will be less than 5 ppb, following a "wash out" period of about six months.

2. Proposed Effluent Limitations, Schedules of Compliance and Special Conditions

Presently the plant is operating under a valid NPDES permit (#3450) for a mercury cell process plant. The application is for the diaphragm cell process, which will be fully operational by March 31, 1975. Until that time the interim conditions are the same as the present permit. Following start-up of the diaphragm cell, there will be zinc and possibly nickel discharges, but these are not expected to be significant. The TSS level is less than EPA requirements. Monitoring of flow, temperature, TSS, chlorine residual, mercury, zinc, nickel is required. All monitoring results will be available to the public. After June 30, 1977, the chlorine residual is reduced. The monitoring program is to be continued, but at reduced frequency. The monitoring of mercury, zinc and nickel may be discontinued, if the levels found under the interim monitoring program prove to be insignificant.

3. Applicable Effluent Limitations and Water Quality Standards

Effluent limitations--Effluent Limitation Guidelines and Proposed Guidelines for Existing Sources to Pretreatment Standards for Incompatible Pollutants for Inorganic Chemicals Manufacturing Point Source Category, Federal Register 39 (40), Tuesday, March 12, 1974.

Water Quality Standards--State of Washington, Department of Ecology, Water Quality Standards, effective June 19, 1973, amended effective August 20, 1973.

Discharge 001 Lat. 46°07'43"
Long. 122°59'19"

Discharge 002 Lat. 46°07'46"
Long. 122°59'24"



Weyerhaeuser Company

Longview, Washington 98632
A.C. 206 • 425-2150

February 21, 1977

Mr. Richard W. Greiling
District Engineer
Department of Ecology
Olympia, Washington 98501

Dear Mr. Greiling:

Re: NPDES Permit No. WA-003767-2
Weyerhaeuser Company Chlorine Plant
Longview, Washington

Table S5 of the subject permit limits the parameter mercury to 0.002 mg/l beginning March 1, 1977. We respectfully request the conditions of Table S1 be allowed until July 1, 1977, to enable us to complete transfer of sludge and other mercury contaminated materials to the authorized disposal site. We have experienced delays in completing this work for the following reasons:

1. Two week delay in readying the disposal site and some initial problems with the transport equipment.
2. It was found not possible to load the sludge without thinning, thereby generating extra tonnage and protracting the hauling.
3. Time lost due to Weyerhaeuser strike of 16 days.
4. Time lost due to teamsters strike of 20 days.
5. Our policy of not hauling during bad weather conditions in the Columbia River Gorge has cost two weeks, but we have had no transportation incidents.
6. About 2,000 extra tons of sludge had to be hauled beyond the original estimate because certain process equipment was not cleaned as per plan. Therefore, the sludge generated in the interim was subject to contamination.

Mr. Richard W. Greiling
February 21, 1977
Page 2

We did add a third truck to the job on the 1st of December. The normal hauling rate is six loads per day, six days a week.

Sincerely,



R. H. Zulch
Pulp and Paperboard
Manufacturing Manager

RHZ:cj

cc: V. W. Bousquet
G. E. Gray
H. H. Houtz
T. K. King, CH 1-44
J. S. Larsen
D. Rittenbach
D. E. Werth

EXHIBIT 4

APPLICATION FOR CERTIFICATION OF POLLUTION CONTROL FACILITY

PROJECT: LONGVIEW CHLORINE PLANT CONVERSION

INTRODUCTION

Weyerhaeuser Company operates a chlor-alkali plant at its pulp mill site on the Columbia River at Longview, Washington. The facility produces an average of 265 tons of chlorine per day in two cell rooms, which employ the mercury cell process.

The Company is now operating under NPDES Permit No. 3450 issued March 16, 1973, which requires that water wastes discharged into the diffuser outfall at each plant shall not contain more than .2 lbs. of mercury per day (average for month) based on a 24-hour composite sample. After January 1, 1976, the discharge rate is reduced to .1 lbs. of mercury per day.

Air emission standards have been published by the U.S. Environmental Protection Agency under Hazardous Air Pollutants: Mercury, 40-CFR61, Air Regulation, Page 125. The Washington State Department of Ecology has included this regulation as part of its state air pollution control plan.

Faced with regulations and with the uncertainty of future standards, the Company made the decision to discontinue the use of mercury by converting to a diaphragm process and thus meet the goal of employing the best available technology. The conversion provides no operational advantages and is being made solely for environmental considerations.

Preliminary studies show that operating expenses for the diaphragm cell system will be \$1.44 a ton/chlorine more than for the mercury cell system. Steam for removing salt and evaporating 11.3% caustic cell liquor to 50% will be \$2.20 a ton while the mercury cell system does not require this system.

The operations are being consolidated into a single cell room and capacity is being expanded to 385 tons per day. It should be noted that consolidation is the cheaper alternative to the conversion of the two separate cell rooms. Expenditures on expansion have been excluded from this application. Moreover, in relation to expansion no certification is

being requested on expenditures in excess of those that would have been incurred had the expansion taken place through the addition of more mercury cells.

DESCRIPTION OF EXISTING FACILITIES

The manufacture of chlorine and caustic soda first involves converting raw salt to a hot saturated solution. The brine is treated, clarified and filtered to remove impurities. The pure brine is conveyed to electrolytic mercury cells where the electric current from graphite anodes to the mercury cathodes breaks the salt into its component elements of sodium and chlorine. The chlorine gas deposits to the anode and is taken from the cell. The chlorine gas is processed by removing water vapors and liquefying it for storage or use.

The amalgamated mercury and sodium moves from the cell to a decomposer where water is introduced. Sodium, hydrogen and oxygen from the water combine to form sodium hydroxide, commonly called caustic soda. The surplus hydrogen element is drawn off for other purposes or disposal. The mercury is returned to the cells for reuse. Caustic soda as a 50% solution is filtered and stored for use or shipment.

Pollution can occur if mercury escapes as a gas into the atmosphere, in sludge from the brine clarifier or in effluent water. The conversion of the plant to a diaphragm cell process eliminates mercury from the process.

Present facilities consist of a single salt handling and brine preparation department serving both cell rooms. The salt dock and storage area is designed to receive shipments of approximately 11,000 tons of raw salt on a regular basis from self-unloading water carriers. These facilities have not been modified since their construction in 1955.

Salt is conveyed from the dock to the dissolvers and there made into brine. Brine then flows through six reactors in series, where impurities are precipitated and flocculated. Sedimentation in three large clarifiers and filtration in automatic back wash sand filters complete brine purification. This system was expanded and improved in 1966.

Brine sludge, the precipitated impurities, was formerly washed and sewered. In 1970, when the mercury problem arose, the system was closed and land storage was substituted. Dewatered sludge is now trucked to a D.O.E. authorized disposal site.

Cell room #1 contains 126 mercury cathode electrolytic chlorine cells (DeNora 14 TGL), of which 66 were installed in 1956 and 60 in 1958. The net chlorine capacity is 145 tons per day. There are four 10,000 amp silicon diode rectifiers capable of a circuit load of 40,000 amperes at 632 volts.

Cell room #2 contains 16 mercury cathode cells (DeNora 24H5) built in 1967 with four 65,000 amp ITE rectifiers capable of a total circuit load of 260,000 amps DC at 200 volts. The net chlorine capacity is 120 tons per day.

Chlorine Liquefaction #1 contains equipment for cooling, drying, compressing, liquefying and storing the production from #1 cell room. Employed are:

Two-stage titanium chlorine coolers

Brinks Demister

Two-stage drying with sulfuric acid.

Two-stage compression to 60 psig. (4 reciprocating machines, two first-stage, one second, one spare for either stage.)

Liquefying systems, consisting of a refrigeration machine and heat exchangers. (2 systems operational, one spare.)

Storage tanks, five at 60 tons each.

Air compressors for moving liquid chlorine (2).

The pulp mill, which uses about 90 tons of gaseous chlorine per day, is supplied from the compressor station discharge. During the infrequent periods when the #1 cell room is shut down, the pulp mill is supplied by revaporizing liquid chlorine from storage.

Chlorine Liquefaction #2, built in 1967, contains nearly identical equipment to that in #1, except that no provision exists for directly supplying the pulp mill. Compressor foundations have been installed and other provisions made for expansion to 250 tons chlorine/day from the present 150.

Single stage chlorine liquefiers are 90-93% efficient when operating at normal temperatures and pressures. Under such conditions, therefore, 7-10% of the plant chlorine capacity must be recovered from the non-condensable gas stream leaving the liquifiers. Chlorine rail car vent-

ing produces a chlorine-air mixture which also must be handled. At present, all such chlorine is absorbed in caustic to produce sodium hypochlorite (40 gpl available chlorine) for pulp bleaching. Demand is normally such that additional pure chlorine must be used in a redox controlled final chlorination step.

During the 1967 expansion, a carbon tetrachloride absorption system was installed adjacent to the #2 compressor house to accommodate the noncondensable gas from those liquefiers when expanded to 250/TPD capacity.

Hydrochloric acid is produced in two 4 ton/day units, one installed in 1965, one in 1967. Hydrogen from the cells is burned with gaseous chlorine, forming hydrochloric acid gas which is absorbed in water for storage and use.

Caustic is produced as a 50% solution in the cells and requires only filtration before shipment by truck, rail or barge. Capacity in three storage tanks is 4,000 tons caustic, dry basis. Caustic for the pulp mill (80-100 tons/day) is diluted to 25% before transfer.

The daily rate of caustic production is stoichiometrically proportional to the chlorine production; 1.128 times 265 or 299 net tons per day for the combined plants.

A rail car loading and testing station common to both plants was installed in 1956 and expanded in 1967. Railroad trackage was also increased in 1967. Two track scales are in use but the older is not adequate for large cars.

All construction schedules will be conceived so as to offer the least interruption of current plant production balanced against safety, construction economy and early plant start-up.

PROPOSED 385 TON CHLORINE PER DAY FACILITY

GENERAL

Plant I will be operated until the new facilities are installed and operating. Plant II building will be expanded to accommodate part of the diaphragm cells while the mercury cells are in operation. As soon as the first set of the cells is installed, the cells will be connected to the existing rectifiers and placed in service, with the DeNora cells removed from service. The balance of the diaphragm cells will then be

installed and placed in service. When all new plant II cells are on line, plant I will be shut down and the DeNora cells and equipment will be removed. Wherever possible, existing plant equipment will be reused in the new diaphragm cell system.

SITE PREPARATION

The existing site requires soil preparation, road revisions, railroad additions, employee parking lot revisions, yard lighting and temporary construction areas. All these items are excluded from this application.

The major item of cost attributable to pollution control is removing building I equipment, piping, DeNora cells and demolition of drying towers, acid tanks and dechlorination tower. X

SERVICES

The pollution control items in services required for other than expansion are steam lines for concentrating caustic and a well for obtaining cooling water which were not required in the mercury cell process. The rest of the services are considered expansion items.

SALT DOCK, STORAGE AND BRINE

Revisions to these items are due to expansion of rated capacity.

CELL ROOM

Additions to plant II cell room building are for expansion of the rated capacity of the plant. The balance of the items of cost are for replacing the rated capacity of the existing chlor-alkali plant. Cells will be Diamond Shamrock DS - 45 diaphragm cells utilizing metal anodes (D.S.A.). The cell renewal area will be located in the cell building.

CHLORINE COOLING DRYING AND DISPOSAL

Chlorine cooling will be accomplished in a two-stage titanium cooler utilizing cooling tower water first, then 54° F. water from a well.

Chlorine will be dried in a new 2-unit single-train system with counter flow sulfuric acid. Demisters will be used before and after the drying towers. The chlorine condensate stripper and chlorine disposal towers are pollution control equipment in themselves. Only that portion of the balance of the equipment is requested for certification as replaces the rated capacity of the chlor-alkali system.

CHLORINE CONVERSION LIQUEFACTION AND STORAGE

Existing equipment will be supplemented by new equipment. Two additional 200 ton storage tanks will be added. All the additional equipment is due to expansion of the rated capacity of the plant except a new low pressure pipeline and a high pressure pipeline to the existing compressor house, which is a cost directly related to the conversion.

LOADING STATIONS

Small scales are being overhauled to handle 90 ton tank cars. The items represent expenditures for expansion of the plant and not pollution control.

SNIFT GAS RECOVERY SYSTEM

The Snift gas recovery system is a pollution control system to absorb non-condensable chlorine in carbon tetrachloride. The chlorine is then stripped out and recondensed. This system is a pollution control device.

HYDROGEN COOLING AND HYDROCHLORIC ACID

This system is used to cool and pump hydrogen to the HCl burners to produce plant requirements of hydrochloric acid. The balance of the hydrogen is pumped to a boiler in the pulp mill for burning or otherwise safely used in another project. Existing facilities will be reused. This system qualifies as a pollution control facility in that it represents a cost of conversion.

CAUSTIC EVAPORATORS

A new caustic evaporator system to evaporate 11.3% caustic to 50% will be installed. This will be a triple-effect system with three heaters and four vapor bodies. Salt in the caustic will be reduced to 1% with the use of coolers, centrifuges and filters. The salt from the evaporators will be returned to the brine system. The last two stages of the caustic coolers will utilize 54° well water. Only the cost of replacing present rated capacity is included in costs for pollution control.

None

WATER COOLING TOWER

Done
Purpose
A water cooling tower will be installed adjacent to the evaporators. It will cool water from evaporators, caustic coolers, chlorine coolers, hydrogen cooler and flash condenser. The system qualifies as a pollution control system because it will provide for the reuse of water and will reduce release of hot water in the effluent to meet water quality standards.

QUALIFICATION FOR CERTIFICATION AS A POLLUTION CONTROL FACILITY

Q
This project qualifies for certification as a pollution control facility under RCW 82.34 and the Department of Ecology regulations with respect to the systems which serve no function other than pollution control and the portion of the plant which replaces the productive capacity of the existing mercury cell chlor-alkali manufacturing plant.

- A. The facility conforms to the definition of a "facility" in WAC 173-24-030(3).
- B. The facility is not necessary to the manufacture of products as defined in WAC 173-24-030(4) to the extent that it replaces present facilities for the manufacture of chlorine and caustic soda. But for environmental concern an installation of a diaphragm cell system would not have been considered. It should be noted again that none of the expenditures representing expansion are included in the application. Provisions had been made in the chlor-alkali system for the eventual increase of production in plant II from 120 tons/day to 250 tons/day chlorine. This expansion was precluded by pollution control regulations.

- C. This facility complies with requirements of RCW 82.34 since the application was timely filed and the intent is to operate the facility for the primary purpose of complying with pollution control regulations. The facility is intended to be suitable, reasonably adequate and meet the intent and purposes of chapter 70.94 RCW or chapter 90.48 RCW, as required by regulation WAC 173-24-080.
- D. The facility is for the purpose of pollution control, WAC 173-24-090, and is being installed only in response to the requirements of the Department of Ecology. The facility is designed to achieve the best known, available and reasonable means to meet or exceed present applicable regulations and standards.
- E. The operation of the facility will provide that emissions or effluents from the facility will contain measurably less pollutants than were obtained by the present chlorine and caustic soda manufacturing facilities. The facility is not necessary to the manufacture of products. The present level of production can be maintained by the chlor-alkali plant as required by WAC 173-24-100 but for pollution control regulations.
- F. This project meets the intent of WAC 173-24-110 in that it is suitable, reasonably adequate and operation of the plant with these facilities installed will not be in violation of any present provision of chapter 70.94 RCW or chapter 90.48 RCW. -Wronz
pit,

ENVIRONMENTAL PROTECTION AGENCY

REPLY TO:
ATTN OF:

10EP - M/S 521

DATE: January 10, 1973

SUBJECT:

Field Investigation of Weyerhaeuser Chlor-Alkali Plant, Longview, WA

File

TO:

The Files

Thru:

Dan Bodien, Chief, Engineering Section
Lloyd A. Reed, Chief, Permits Branch
Leonard A. Miller, Director, Enforcement Division

An inspection was made of the Weyerhaeuser Co. Chlor-alkali facilities in Longview on January 4, 1973 along with Dick Burkhalter, Department of Ecology, southwest district engineer, Mr. Robert Hoss, pulp-paper & chemical facilities manager and Dr. Harold Houtz, chlorine plant manager conducted the plant inspection.

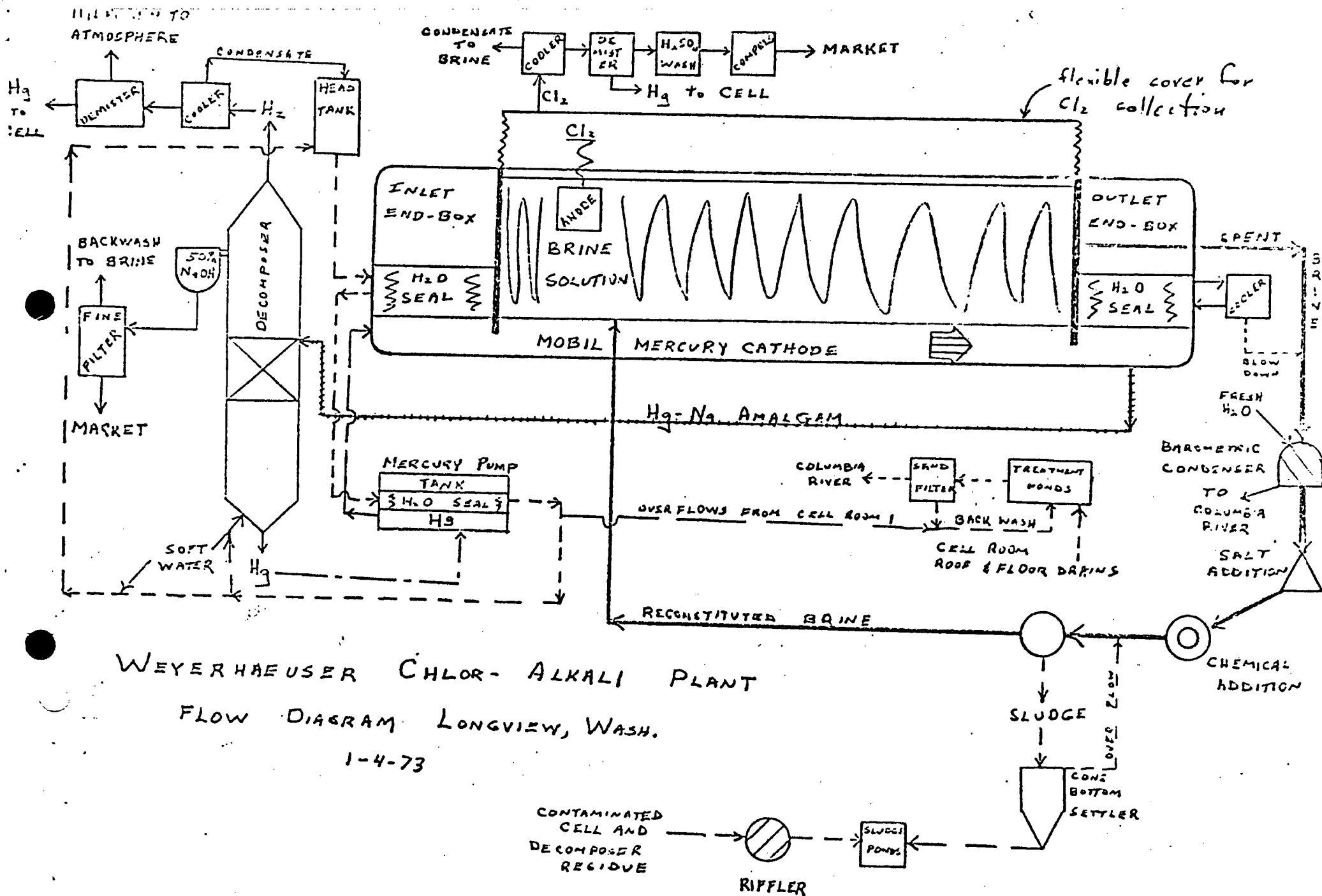
General Plant Description

The Weyerhaeuser Co. facilities at Longview consists of two main cell rooms. The first cell room was built in 1956-58 and contains 126 Dinova chlorine cells each containing 45 flasks (3,420 lbs) of mercury. The second cell room was placed on line in 1967. It contains 16 larger Dinova cells each containing 120 flasks (9,100 lbs) of mercury. The brine processing system is common to both plants. Each cell room has its own outfall to the Columbia River. Since the plant visit made on August 3, 1970, by Jim Willmann and Gary O'Neal, the brine handling and end-box seal waters are handled similarly for both cell rooms. Attached is a typical flow diagram for the Weyerhaeuser Co. recycling system.

Dr. Houtz indicated that the average production rates reported on the Corps of Engineers RAPP application form are not currently valid. He indicated that due to an increased pulp market the chlorine plant is unable to meet the company's chlorine demand. He stated, therefore, that the average daily production, when power is available, is in the range of 145-150 tons/day chlorine and 165 tons/day caustic at cell room 1 and 130 tons/day chlorine and 143-145 tons/day caustic for cell room no. 2.

Inlet End-Box Seal Water

Inlet end-box water acts as a vapor seal for the mercury being fed into the chlorine cell. A continual flow of water is kept running through the inlet end-box to guarantee a complete seal. The water flows out of the inlet end-box and into a mercury pump tank located on the next floor below the cell room. The water again serves as a vapor seal over the mercury in the pump tank. From the pump tank the water overflows to a pump sump where it is pumped to the roof of the building to a head tank. This tank is then used as the feed water into the inlet end-box where the cycle is repeated.



Outlet End-Box Seal Water

Water is also used on the outlet end-boxes as a vaporseal. Because of contaminants picked up in the cell by the mercury, the outlet end-box seal water is kept separate from the inlet end-box seal water. In cell room 1 the outlet end-box seal water is discharged to the spent brine system as a batch discharge. In cell room 2 a continuous bleed off of the seal water to the spent brine system keeps the salt buildup in the seal water within acceptable limits.

Decomposers

The mercury leaving the chlorine cell is actually a mercury-sodium amalgam. The fact that the sodium formed at the mercury cathode of the cell will amalgamate with the mercury and remain in a liquid state at controlled temperatures, is one of the main reasons the mercury cell method of chlorine-caustic production is used.

The liquid mercury-sodium amalgam is pumped into a decomposer which is actually a packed column. The packing medium is crushed graphite. A mixture of softened water and head tank water from the inlet end-box system is pumped into the bottom of the decomposer and flows upward through the graphite. The mercury-sodium amalgam is injected at the upper surface of the packing. The water reacts with the sodium to create 50% NaOH which is drawn off the top of the decomposer. The mercury flows to the bottom of the decomposer and is returned to the mercury pump tank for recycle to the cell inlet end-box.

The sodium hydroxide is given fine polishing filtration to remove particulate mercury before being sold. The filters are of compressed carbon material with approximately 15 micron openings. Each tube is 4 1/2" O.D. and 2 1/2" I.D. The caustic enters the outside and flows to the center of the tube. Back flushings go to a sump where mercury is settled out. The water is then used to aid in neutralizing the brine stream so that all solids eventually end up in the brine sludge.

Hydrogen Cooler Condensate

The caustic reaction in the decomposer liberates hydrogen gas. This gas is highly contaminated with mercury vapor, water vapor, and entrained water droplets contaminated with mercury. The hydrogen is passed through a direct contact cooler which uses refrigerated water and then through a Brinks Demister before being vented to the atmosphere. The collected mercury is returned to the chlorine cell while the condensate is returned to the head tank.

Cooling Water

The spent brine, leaving the cell at 200-230°F, is first cooled before being reconstituted. The brine from cell room 1 is passed through a direct contact barometric condenser using fresh water as the coolant. The water picks up considerable mercury contamination and is in fact, according to Dr. Houtz, the main source of mercury loss from cell room no. 1.

The spent brine from cell room no. 2 is passed through a shell and tube condenser for cooling and thus does not create a similar source of mercury contamination.

Chlorine Collection

The chlorine emitted at the graphite anode of the cell is collected under a flexible cover over the cell and is pumped to a tube and shell cooler. Mercury contaminated water vapor is condensed here and is returned to the spent brine system. The chlorine is then passed through a Brinks Demister followed by a sulfuric acid scrubber to remove any final water vapor. It is then cooled and compressed to the liquid state and loaded into rail cars at 60-120 psi pressure.

Brine System

The spent brine leaving the cell has lost about 10% of the NaCl it contained when first introduced into the cell. It is collected from both cell rooms and pumped to the spent brine holding tanks. From there it is pumped to the reconstituter where it is contacted with raw NaCl to achieve saturation. From there it is treated with chemicals to remove undesirable contaminants, mainly the magnesium, calcium and sulfate ions. The treated refortified brine passes through two clarifiers to allow settling before being recycled to the cell rooms.

The sludge collected in the clarifiers is at 5-6% solids. It is transferred to one of two cone-bottom settlers. When sludge begins to overflow the settler, then one-half its contents is pumped to the sludge ponds at about 12% solids.

Dr. Houtz, when asked what plans Weyerhaeuser Co. was making for future sludge handling, indicated the previous plan to install vacuum filtration and long term storage have been temporarily halted while the company investigates the results on Georgia Pacific's, EPA sponsored, report. Meanwhile nothing is being done to either study the current pond leachate or to curb possible groundwater contamination with mercury.

Periodically it is necessary to shut down a cell and clean out contaminated residues. These residues, high in mercury contamination, are passed over a very primitive riffler and then discharged into the sludge holding ponds. At the time of this visit the wooden flume between the riffler and the sludge pond contained considerable amounts of liquid mercury. This indicates that the riffler is almost useless in catching the mercury in the cell residues and that considerable volumes of mercury are being discharged to the ponds.

The mercury contaminated water from both cell room floors and roofs is discharged into a small treatment pond where ferric sulfate is added to settle metallic mercury. The effluent from the second pond of the series is passed through two very crude, and probably very low efficiency sand filters before being discharged to the outfall. The sand filters are made of plywood with a 4" plastic pipe, containing small holes drilled the length of its underside, suspended above the sand to act as the distributor. The pipe was only discharging from about 1/3 of its length and thus was not functioning too well. There was no apparent backwashing facilities although we were informed the filters were backwashed into the treatment ponds.

The ponds, about 2 years old, have never been cleaned and the company is not anticipating a need for this in the near future. The bottoms of the two treatment ponds and the five sludge holding ponds consist of loose sandy soil and would provide very good seepage for the highly contaminated liquids contained in the ponds. Weyerhaeuser Co. has not done any analysis of the extent of this possibility nor ways to control the loss of mercury from these sources.

Miscellaneous

In response to my question, Dr. Houtz said the high chlorine residual in the plant effluents generally comes from spills in the spent brine system and/or general plant upsets. He stated they had a high chlorine residual in the treated water coming into their plant from the Weyerhaeuser Co. water treatment facilities which was in the range of 1.0-1.5 ppm or greater. He said this residual was then carried through the chlorine plant and appeared in their effluent. This is a questionable source as far as I'm concerned.

I then questioned Dr. Houtz concerning the numerous "upsets" reported over the last two years which resulted in excess mercury discharges for the days reported. The first cause was "power outage". Dr. Houtz said it should be obvious that if they loose their power they have no control over their effluent. This would tend to support our requirement of a secondary power source.

The second cause reported on several occasions was failure of various pieces of equipment. This would support preparation of a spill prevention and control plan.

In two cases "plant shutdown" resulted in excess mercury being discharged. No reasonable explanation was given for this.

A third problem area, apparent by the times listed, is the barometric condenser for cell room no. 1. Dr. Houtz indicated that the condenser was getting old and tended to have problems. Installation of a new tube and shell condenser would aid in decreasing the total mercury discharged by the plant by first reducing the number of breakdowns, second eliminating the main source of mercury contamination from cell room number 1, and finally, eliminating the need for the two treatment ponds now in use.

The final problem area, apparent from the list of "causes", is that of "heavy rain". Any rain falling on the salt storage dock is collected and pumped to a rain brine storage tank for use in the brine system. Spent brine from the cell rooms, highly contaminated with mercury, is also stored in this tank, thus contaminating the rain brine with mercury. During heavy rains excess rain brine is discharged to the sewer, thus the high mercury levels.

When queried concerning the numerous puddles of discolored water noted around the plant, Dr. Houtz said that the discoloration was due to material precipitated out of the plants various air emissions and then washed off buildings and streets by the rain. No analysis has been made of the contents of this rain water.

Finally the company has not and indicated they were not considering any action to handle spills, floor washings, etc. These were still allowed to enter the sewer for direct discharge.

Summary & Conclusions

During the tour, Dr. Houtz continually referred to the facility at two distinct plants, Plant 1 and Plant 2. The total plant arrangement is not unlike an aluminum reduction plant containing two or more cell rooms. Even though an aluminum plant has two distinct pot lines built at different times, the facility is considered one plant. This is true of all the aluminum plants in this Region. I have, therefore, referred to the two items as cell room 1 and cell room 2, rather than Plant 1 and Plant 2. If each cell room was a unit in itself, I would agree on the designation, but since they share a common brine system, I do not feel this is a valid distinction based on the precedent set by the aluminum industry.

Several areas were apparent where action should be required to lower the mercury level in the plant discharge. It appears to me that with these additional actions and a better operation and maintenance program, the company should be able to considerably lower their mercury discharge from the Longview facility. These items are:

1. Replace the direct contact barometric condenser for cell room number 1 with a shell and tube condenser.
2. Segregate the rain water brine storage from the spent brine storage contaminated with mercury.
3. Prepare and implement a spill prevention and clean-up plan.
4. Provide a secondary power source for all facilities directly related to effluent control.
5. Collect and treat for mercury removal all runoff waters from the plant site.
6. Replace the existing sand filtration system with a properly designed and operated facility.
7. Provide adequate mercury removal facilities for treatment of contaminated cell and decomposer residues.
8. Dredge the existing sludge storage ponds and seal each pond. Provide positive surface runoff collection and treatment facilities for pond runoff.
9. Investigate and install a sludge treatment system to reclaim the mercury contained in the sludge now stored at the plant site.
10. Contain and treat for mercury removal floor washings, spills, etc.

In summary, it appeared that the efforts made by Weyerhaeuser to reduce mercury discharges from their chlor-alkali plant at Longview have been very minimal. Those facilities viewed give the appearance of being marginally effective in maintaining consistently low mercury discharges.

Incidental Observations on Air Emissions

During the course of the plant tour, several areas appeared obvious where actions could possibly be taken to reduce mercury vapor discharges.

In cell room 2, Weyerhaeuser Co. has installed inlet end-box covers. The vapors are drawn to a shell and tube condenser and then through a Brinks Demister. The mercury captured by these Demisters and the other Demisters mentioned earlier is recycled to the cells. Dr. Houtz indicated the demisters on this system and on the hydrogen cooling system collect considerable amounts of mercury, but he would not indicate a quantitative measure. He also said the company had no current plans for installing a similar system in cell room 1.

If "considerable" quantities of mercury are collected from the vapors over the cell room 2 inlet end-boxes, then it would seem similar amounts could be collected from all the end-boxes, both inlet and outlet.

Another apparent source of mercury vapor loss is from the mercury pump tanks located below each cell. Each pump tank had a loose fitting cover and thus would allow considerable vapor loss even with the water seal over the mercury.

Finally each cell room was vented, by fans in the roof, to the atmosphere. By treating all these vents and the end box and pump tank vapors, it would appear that a considerable reduction in mercury loss to the atmosphere could be achieved.

Dan Robison

Dan Robison
Washington State
Field Consultant

Attachment

SUMMARY OF PROGRESS ON MERCURY CONTROL

Chronology of Improvements

Prior to April 27: All mercury-contaminated waste streams, with the exception of inlet box seal water, were sewerred. These include the sludge from the brine process, condensate from the hydrogen coolers, outlet end box seal water, floor washings, and the overflow from the mercury washer used to process cell washings.

April 27, 1970: Stopped sludge discharge to sewer; stored it in tanks.

May 5, 1970: Completed a storage pond for sludge. Pond is an unsealed excavation in sand. Dimensions are 60' x 150' x 4'. All water loss from ponds is through seepage and evaporation.

May 7, 1970: Pumped sludge to storage pond. Operation of clarifiers was altered to reduce water content in sludge. Prior to this time sludge averaged 3 percent solids, with 40-50 ppm Hg. Solids content now 10-12 percent.

May 11, 1970: Ceased discharge to sewer of liquid wastes from mercury washer. Unit was moved outside adjacent to sludge pond. All discharges now directed to pond.

May 19, 1970: Ceased discharge to sewer of condensate from Plant No. 1 hydrogen cooler. Contaminated water now introduced into caustic water recovery system.

June 14, 1970: Outlet end box water from Plant No. 1 (126 cells) recycled into brine system. It is either added directly to brine or is used in the sludge washing process first.

July 6, 1970: Installed new hydrogen cooler system in Plant No. 2. All condensate recycled to caustic reaction.

July 13, 1970: Completed second storage pond to receive floor washings from Plant No. 1. Some clean water from steam condensate, eyewash fountains, etc. also diverted to pond.

July 28, 1970: Third pond completed to receive all floor washings and end box water from Plant No. 2.

July 30, 1970: Started adding raw sulfur to ponds. Plant personnel said they hoped it would tie up the soluble mercury in the ponds. All sewers from the cell rooms are blocked.

Future Changes

August 8, 1970: Hydrogen cooler will be installed for Plant No. 1. Condensate will be returned to caustic reaction.

August 12, 1970: Installation of cooling system for air from end boxes and mercury pumps in Plant No. 2. Condensate will be returned to system if purity permits. If not, it will be directed to ponds.

August 17, 1970: Rotary vacuum filter test unit will be operational. Sludge will be treated to remove mercury-contaminated water for recycle into system.

September, 1970: Installation of equipment necessary to recycle end box water for Plant No. 2.

October 1, 1970: Tentative date for installation of Brinks demisters on the hydrogen cooling system for Plant No. 1 and No. 2 and on the end box air system for Plant No. 1.

Company personnel indicated additional studies are being conducted on the recovery of mercury from the sludge. They also indicated a willingness to start immediate treatment of water from sludge and other waste streams. They indicated they would like to try sodium bisulfide treatment, but understood it was not being approved by FWQA.

Further monitoring of Hg in effluent should be continued to document further improvements and to assess levels contributed by condensate from barometric cooler.

IN THE MATTER OF THE COMPLIANCE)
by the Weyerhaeuser Company)
with Chapter 90.48 RCW and the)
Regulations of the Department of Ecology)

NOTICE OF VIOLATION
Docket No. DE 70-120

To: Weyerhaeuser Company
Chlorine-Caustic Plant
P. O. Box 599
Longview, Washington 98632

On December 4, 1967, the Department of Ecology (then identified as the Water Pollution Control Commission) adopted a regulation relating to "Water Quality Standards for Interstate and Coastal Waters of the State of Washington and a Plan for Implementation and Enforcement of Such Standards." This regulation established water quality standards for all interstate and coastal waters and, further, the regulation required that all known, available and reasonable methods of waste treatment and control, as provided by the controlling statutes found in Chapter 90.48 RCW, shall be utilized by those discharging wastes into the waters of the state.

By letter of April 27, 1970, a copy of which is attached and by this reference is made a part hereof, this agency advised you of several deficiencies in the matter of compliance with the conditions of your waste discharge permit No. 2648. Your attention was specifically directed to the presence of significant concentrations of mercury in wastes being discharged into the Columbia River from your facility. Further, you were advised that the discharge of mercury from your facility is not authorized by your Permit No. 2648 and that the presence of this contaminant in your waste effluent places you in violation of your Permit No. 2648.

As you are aware, recent findings have indicated that the presence of mercury in public waters constitutes an imminent health hazard. Government agencies and the public are extremely concerned with this threat to public health and welfare and extensive investigations and analyses are currently in progress to more clearly define the seriousness of the presence of the mercury contaminant in our public waters. Mercury concentration ranges and human tolerance limits will result from the current studies that predictably may indicate a need for the total exclusion of mercury from industrial waste effluents that are discharged into public waters.

RCW 90.48.120 reads in part: "Whenever, in the opinion of the commission, any person shall violate or is about to violate the provisions of this chapter, or fails to control the polluting content of waste discharged or to

Weyerhaeuser Company
Notice of Violation

be discharged into any waters of the state, the commission shall notify such person of its determination by registered mail . . ." Notice is hereby given, in accordance with RCW 90.48.120 as follows:


1. That the Weyerhaeuser Company Chlorine-Caustic Plant, located in Longview, Washington has been and is discharging industrial wastes into the Columbia River, a public water of this state, and that said industrial wastes contain mercury in significant concentrations that are or may be detrimental to the public health.

2. That it is the determination of this agency that the Weyerhaeuser Company will take necessary action to reduce the concentration of mercury discharged into the Columbia River from the Chlorine-Caustic Plant and that said mercury concentrations will be reduced to a limit of 0.05 parts per million (ppm) or less not later than September 1, 1970.

3. That it is the determination of this agency that the Weyerhaeuser Company will take action to either totally eliminate the discharge of mercury from the Chlorine-Caustic Plant, or will show cause before this agency not later than October 1, 1970, as to why all discharges of mercury should not be prohibited by this agency.

Within thirty days from the receipt of this Notice, as provided in RCW 90.48.120, you are ordered to file with the Department of Ecology a full report stating what steps have been and are being taken to comply with the above-described determinations of this agency. (In regards to the implementation hereof, the Director of the Department of Ecology has delegated authority pursuant to Sections 8 and 9 of Chapter 62, Laws of 1970, to Assistant Director, JAMES P. BEHLKE. See IN RE Adoption of Emergency Regulation, Department of Ecology, Docket No. 70-1.)

DATED at Olympia, Washington this 24th day of August, 1970.


ASSISTANT DIRECTOR
Department of Ecology
State of Washington

Copies of this Notice are
distributed as follows:

1. Docket No. DE 70-120
2. Weyerhaeuser Company (2 copies)
3. Attorney General

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER

FOR AGENCY USE			
WA	03	76	72

STANDARD FORM C - MANUFACTURING AND COMMERCIAL

SECTION I. APPLICANT AND FACILITY DESCRIPTION

Unless otherwise specified on this form all items are to be completed. If an item is not applicable indicate 'NA.'

ADDITIONAL INSTRUCTIONS FOR SELECTED ITEMS APPEAR IN SEPARATE INSTRUCTION BOOKLET AS INDICATED. REFER TO BOOKLET BEFORE FILLING OUT THESE ITEMS.

Please Print or Type

1. Legal Name of Applicant
(see instructions)

101

WEYERHAEUSER COMPANY

2. Mailing Address of Applicant
(see instructions)
Number & Street

102a

P.O. BOX 1645

City

102b

TACOMA

State

102c

WASHINGTON

Zip Code

102d

98401

3. Applicant's Authorized Agent
(see instructions)
Name and Title

103a

Dr. H. H. Houtz

Chlorine Plant Manager

Number & Street Address

103b

P.O. Box 188

City

103c

Longview

State

103d

Washington

Zip Code

103e

98632

Telephone

103f

206 425-2150 (Ext. 345)

Area Number
Code

4. Previous Application
If a previous application for a
National or Federal discharge per-
mit has been made, give the date
of application. Use numeric
designation for date.

104

70 7 27
YR MO DAY

I certify that I am familiar with the information contained in this application and that to the best of my knowledge and belief such information is true, complete, and accurate.

Dr. H. H. Houtz

Printed Name of Person Signing

Chlorine Plant Manager

Title

Signature of Applicant or Authorized Agent

74 7 3
YR MO DAY

Date Application Signed

18 U.S.C. Section 1001 provides that:

Whoever, in any matter within the jurisdiction of any department or agency of the United States knowingly and wilfully falsifies, conceals or covers up by any trick, scheme, or device a material fact, or makes any false, fictitious or fraudulent statement or representation, or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than \$10,000 or imprisoned not more than five years, or both.

FOR AGENCY USE

Received _____
YR MO DAY

OFFICE: _____ EPA Region Number _____
State _____

5. Facility/Activity (see Instructions)
Give the name, ownership, and physical location of the plant or other operating facility where discharge(s) does or will occur.

Name

Ownership (Public, Private or Both Public and Private)

Check block if Federal Facility and give GSA Inventory Control Number

Location

Street & Number

City

County

State

6. Nature of Business State the nature of the business conducted at the plant or operating facility.

7. Facility Intake Water (see Instructions) Indicate water intake volume per day by sources. Estimate average volume per day in thousand gallons per day.

Municipal or private water system

Surface water

Groundwater

Other*

Total Item 7

*If there is intake water from 'other,' specify the source.

8. Facility Water Use Estimate average volume per day in thousand gallons per day for the following types of water usage at the facility. (see Instructions)

Noncontact cooling water

Boiler feed water

Process water (including contact cooling water)

Sanitary water

Other*

Total Item 8

*If there are discharges to 'other,' specify.

If there is 'Sanitary' water use, give the number of people served.

FOR AGENCY USE

Chlorine Plant

☐ PUB ☒ PRV ☐ BPP

☐ FED

Industrial Way

N/A

Cowlitz

Washington

Manufacture of Chlorine, Caustic, and Sodium

Hypochlorite.

AGENCY USE

4 thousand gallons per day

5036 thousand gallons per day

1440 thousand gallons per day

20 thousand gallons per day

6500 thousand gallons per day

Storm Water

5266 thousand gallons per day

0 thousand gallons per day

650 thousand gallons per day

4 thousand gallons per day

580 thousand gallons per day

6500 thousand gallons per day

290 evaporated; 272 in products; 20 in storm.

90 people served

All Facility Discharges and other Losses; Number and Discharge (see Instructions) Volume. Specify the number of discharge points and the volume of water discharged or lost from the facility according to the categories below. Estimate average volume per day in thousand gallons per day.

		Number of Discharge Points	Total Volume Used or Discharged, Thousand Gal/Day
Surface Water	109a1	2	109a2 5934
Sanitary wastewater transport system	109b1	1	109b2 4
Storm water transport system	109c1	---	109c2 ---
Combined sanitary and storm water transport system	109d1	---	109d2 ---
Surface Impoundment with no effluent	109e1	---	109e2 ---
Underground percolation	109f1	---	109f2 ---
Well Injection	109g1	---	109g2 ---
Waste acceptance firm	109h1	---	109h2 ---
Evaporation	109i1	1	109i2 290
Consumption	109j1	---	109j2 272
Other*	109k1	---	109k2 ---
Facility discharges and volume Total Item 9.	109l1	---	109l2 6500
	109m1		

*If there are discharges to 'other,' specify.

10. Permits, Licenses and Applications

List all existing, pending or denied permits, licenses and applications related to discharges from this facility (see Instructions).

	Issuing Agency	For Agency Use	Type of Permit or License	ID Number	Date Filed YR/MO/DA	Date Issued YR/MO/DA	Date Denied YR/MO/DA	Expiration Date YR/MO/DA
110	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1.	C of E		discharge	071-0YA 2-000093	71-6-17			
2.	Wash. DOE		NPDES	3450	70-7-27	73-3-16	-----	76-1-30
3.								

11. Maps and Drawings

Attach all required maps and drawings to the back of this application.(see Instructions)

12. Additional Information

112	Item Number	Information

STANDARD FORM C - MANUFACTURING AND COMMERCIAL

FOR AGENCY USE

WA0037672

SECTION II. BASIC DISCHARGE DESCRIPTION

Complete this section for each discharge indicated in Section I, Item 9, that is to surface waters. This includes discharges to municipal sewerage systems in which the wastewater does not go through a treatment works prior to being discharged to surface waters. Discharges to wells must be described where there are also discharges to surface waters from this facility. SEPARATE DESCRIPTIONS OF EACH DISCHARGE ARE REQUIRED EVEN IF SEVERAL DISCHARGES ORIGINATE IN THE SAME FACILITY. All values for an existing discharge should be representative of the twelve previous months of operation. If this is a proposed discharge, values should reflect best engineering estimates.

ADDITIONAL INSTRUCTIONS FOR SELECTED ITEMS APPEAR IN SEPARATE INSTRUCTION BOOKLET AS INDICATED. REFER TO BOOKLET BEFORE FILLING OUT THESE ITEMS.

1. Discharge Serial No. and Name

a. Discharge Serial No.
(see Instructions)

201a 001

b. Discharge Name
Give name of discharge, if any.
(see Instructions)

201b

c. Previous Discharge Serial No.
If previous permit application
was made for this discharge (see
Item 4, Section I), provide previ-
ous discharge serial number.

201c 001

2. Discharge Operating Dates

a. Discharge Began Date If the
discharge described below is in
operation, give the date (within
best estimate) the discharge
began.

202a 56 12
YR MO

b. Discharge to Begin Date If the
discharge has never occurred but
is planned for some future date,
give the date (within best esti-
mate) the discharge will begin.

202b YR MO

c. Discharge to End Date If dis-
charge is scheduled to be discon-
tinued within the next 5 years,
give the date (within best esti-
mate) the discharge will end.

202c YR MO

3. Engineering Report Available
Check if an engineering report is
available to reviewing agency upon
request. (see Instructions)

203 ☒

4. Discharge Location Name the
political boundaries within which
the point of discharge is located.

State

204a Washington

County

204b Cowlitz

(If applicable) City or Town

204c N/A

5. Discharge Point Description
Discharge is into (check one):
(see Instructions)

Stream (includes ditches, arroyos,
and other intermittent watercourses)205a ☒ STR

Lake

☐ LKE

Ocean

☐ OCEMunicipal Sanitary Wastewater
Transport System☐ MTSMunicipal Combined Sanitary and
Storm Transport System☐ MCS

Agency Use

204d

204e

204f

FOR AGENCY USE									

Municipal Storm Water Transport System

Well (Injection)

Other

If 'other' is checked, specify

6. Discharge Point—Lat/Long Give the precise location of the point of discharge to the nearest second.

Latitude

Longitude

7. Discharge Receiving Water Name Name the waterway at the point of discharge.(see instructions)

If the discharge is through an outfall that extends beyond the shoreline or is below the mean low water line, complete Item 8.

8. Offshore Discharge

a. Discharge Distance from Shore

b. Discharge Depth Below Water Surface

9. Discharge Type and Occurrence

a. Type of Discharge Check whether the discharge is continuous or intermittent. (see instructions)

b. Discharge Occurrence Days per Week Enter the average number of days per week (during periods of discharge) this discharge occurs.

c. Discharge Occurrence—Months If this discharge normally operates (either intermittently, or continuously) on less than a year-around basis (excluding shutdowns for routine maintenance), check the months during the year when the discharge is operating. (see instructions)

Complete Items 10 and 11 if "Intermittent" is checked in Item 9.a. Otherwise, proceed to Item 12.

10. Intermittent Discharge Quantity State the average volume per discharge occurrence in thousands of gallons.

11. Intermittent Discharge Duration and Frequency

a. Intermittent Discharge Duration Per Day State the average number of hours per day the discharge is operating.

b. Intermittent Discharge Frequency State the average number of discharge occurrences per day during days when discharging.

12. Maximum Flow Period Give the time period in which the maximum flow of this discharge occurs.

☐ STS

☐ WEL

☐ OTH

203b

205a

205b

207a

Columbia River

207b

For Agency Use

Major	Minor	Sub

207c

For Agency Use

303e

203a

50 feet

203b

18 feet

Below adopted low water

209a

☒ (con) Continuous

☐ (int) Intermittent

209b

7 days per week

209c

☒ JAN ☒ FEB ☒ MAR ☒ APR

☒ MAY ☒ JUN ☒ JUL ☒ AUG

☒ SEP ☒ OCT ☒ NOV ☒ DEC

210

N/A thousand gallons per discharge occurrence.

211a

N/A hours per day

211b

N/A discharge occurrences per day

212

From 7 to 9 month month

FOR AGENCY USE				
WA	00	37	67	2

13. Activity Description Give a narrative description of activity producing this discharge. (see instructions)

213a

Basic industrial inorganic chemical manufacture
based on electrolysis of Sodium Chloride Brine in a

diaphragm cell. Chlorine produced is cooled, dried, compressed; thereafter a part
is consumed in the adjacent Weyerhaeuser pulp mill, another part is reacted with
Sodium Hydroxide to produce Sodium Hypochlorite, and the remainder is liquefied for
rail shipment. All Sodium Hypochlorite produced is consumed in the adjacent pulp
mill. Another cell product, Sodium Hydroxide, is produced as a 50% solution. Part
is shipped by rail, truck or barge, the remainder is diluted to 25% for use in the
adjacent pulp mill and for further dilution to 4% for Sodium Hypochlorite manufacture.

Brine preparation, chlorine compression, liquefaction and storage, caustic storage
and dilution, hypochlorite production and storage, Hydrochloric Acid production and
storage, are the activities served by effluent 001.

14. Activity Causing Discharge For each SIC Code which describes the activity causing this discharge, supply the type and maximum amount of either the raw material consumed (Item 14a) or the product produced (Item 14b) in the units specified in Table I of the Instruction Booklet. For SIC Codes not listed in Table I, use raw material or production units normally used for measuring production. (see instructions)

a. Raw Materials

SIC Code	Name	Maximum Amount/Day	Unit (See Table I)	Shared Discharges (Serial Number)
(1)	(2)	(3)	(4)	(5)
214a				

b. Products

SIC Code	Name	Maximum Amount/Day	Unit (See Table I)	Shared Discharges (Serial Number)
(1)	(2)	(3)	(4)	(5)
214b				
2812	Sodium Hydroxide	394	K-1	001,002
	Chlorine	349	K-1	001,002
	Sodium Hypochlorite	38	K-1	001

001

FOR AGENCY USE

15. Waste Abatement

a. Waste Abatement Practices

Describe the waste abatement practices used on this discharge with a brief narrative. (see instructions)

215a

Narrative: Caustic and Hypochlorite areas have area sumps
pumped to waste water treatment through a surge tank.
Effluent monitored for flow, temperature, residual
chlorine and pH.

215b

b. Waste Abatement Codes

Using the codes listed in Table II of the Instruction Booklet, describe the waste abatement processes for this discharge in the order in which they occur if possible.

- | | | |
|-------------------|-------------------|-------------------|
| (1) <u>ESEPAR</u> | (2) <u>ESEGRE</u> | (3) <u>EMERGE</u> |
| (4) <u>RECYCL</u> | (5) <u>OMONIT</u> | (6) <u>CNEUTR</u> |
| (7) <u>SPRESS</u> | (8) _____ | (9) _____ |
| (10) _____ | (11) _____ | (12) _____ |
| (13) _____ | (14) _____ | (15) _____ |
| (16) _____ | (17) _____ | (18) _____ |
| (19) _____ | (20) _____ | (21) _____ |
| (22) _____ | (23) _____ | (24) _____ |
| (25) _____ | | |

WAC037672

16. Wastewater Characteristics

Check the box beside each constituent which is present in the effluent (discharge water). This determination is to be based on actual analysis or best estimate. (see instructions)

Parameter 216	Present	Parameter 216	Present
Color 00080		Copper 01042	
Ammonia 00610		Iron 01045	X
Organic nitrogen 00605		Lead 01051	
Nitrate 00620		Magnesium 00927	X
Nitrite 00615		Manganese 01055	X
Phosphorus 00665	X	Mercury 71900	X
Sulfate 00945	X	Molybdenum 01062	
Sulfide 00745		Nickel 01067	
Sulfite 00740		Selenium 01147	
Bromide 71870		Silver 01077	
Chloride 00940	X	Potassium 00937	
Cyanide 00720		Sodium 00929	X
Fluoride 00951		Thallium 01059	
Aluminum 01105		Titanium 01152	
Antimony 01097		Tin 01102	
Arsenic 01002		Zinc 01092	
Beryllium 01012		Algicides* 74051	
Barium 01007		Chlorinated organic compounds* 74052	
Boron 01022		Pesticides* 74053	
Cadmium 01027		Oil and grease 00550	
Calcium 00916	X	Phenols 32730	
Cobalt 01037		Surfactants 38260	
Chromium 01034		Chlorine 50060	X
Fecal coliform bacteria 74055		Radioactivity* 74050	

*Specify substances, compounds and/or elements in Item 26.

Pesticides (insecticides, fungicides, and rodenticides) must be reported in terms of the acceptable common names specified in *Acceptable Common Names and Chemical Names for the Ingredient Statement on Pesticide Labels*, 2nd Edition, Environmental Protection Agency, Washington, D.C. 20250, June 1972, as required by Subsection 162.7(b) of the Regulations for the Enforcement of the Federal Insecticide, Fungicide, and Rodenticide Act.

17. Description of Intake and Discharge

For each of the parameters listed below, enter in the appropriate box the value or code letter answer called for. (see instructions)

In addition, enter the parameter name and code and all required values for any of the following parameters if they were checked in Item ammonia, cyanide, aluminum, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, phenols, oil and grease and chlorine (residual).

Parameter and Code 217a	Influent		Effluent					
	Untreated Intake Water (Daily Average) (1)	In-Plant Treated Intake Water (Daily Average) (2)	Daily Average (3)	Minimum Value Observed or Expected During Discharge Activity (4)	Maximum Value Observed or Expected During Discharge Activity (5)	Frequency of Analysis (6)	Number of Analyses (7)	Sample Type (8)
Flow* Gallons per day 00056		1,500,000	1,500,000	500,000	2,000,000	CONT.	365	N/A
pH Units 00400		6.6		6	9	CONT.	365	N/A
Temperature (winter) ° F 74028		47.7	65	50	80	CONT.	365	N/A
Temperature (summer) ° F 74027		70.3	88	75	98	CONT.	365	N/A
Biochemical Oxygen Demand (BOD 5-day) mg/l 00310	26	<1	<1	<1	2	1/365	1	G
Chemical Oxygen Demand (COD) mg/l 00340	ITEM		SEE ITEM # 26			1/365	1	G
Total Suspended (nonfilterable) Solids mg/l 00530	SEE	2	5	<1	10	1/365	1	G
Specific Conductance micromhos/cm at 25° C 00095		300 See item 26		120	1,000	1/90	4	2160
Settleable Matter (residue) ml/l 00545		0	0	0	<0.1	1/365	1	G

*Other discharges sharing intake flow (serial numbers). (see instructions)

WA00037672

17. (Cont'd.)

Parameter and Code 217a	Influent		Effluent					
	Untreated Intake Water (Daily Average) (1)	In-Plant Treated Intake Water (Daily Average) (2)	Daily Average (3)	Minimum Value Observed or Expected During Discharge Activity (4)	Maximum Value Observed or Expected During Discharge Activity (5)	Frequency of Analysis (6)	Number of Analyses (7)	Sample Type (8)
chlorine residual, mg/l		1.5	1.5	1	5	CONT.	365	N/A
mercury, mg/l		<0.001	<0.001	<0.001	0.002	1/90	4	24

Plant Controls Check if the following plant controls are available for this discharge.

Alternate power source for major pumping facility.

Alarm or emergency procedure for power or equipment failure

Complete Item 19 if discharge is from cooling and/or steam water generation and water treatment additives are used.

19. Water Treatment Additives If the discharge is treated with any conditioner, inhibitor, or algicide, answer the following:

a. Name of Material(s)

b. Name and address of manufacturer

c. Quantity (pounds added per million gallons of water treated).

☐ APS

☒ ALM

218

219a

219b

219c

d. Chemical composition of these additives (see Instructions).

219d

Complete items 20-25 if there is a thermal discharge (e.g., associated with a steam and/or power generation plant, steel mill, petroleum refinery, or any other manufacturing process) and the total discharge flow is 10 million gallons per day or more. (see Instructions)

20. Thermal Discharge Source Check the appropriate item(s) indicating the source of the discharge. (see Instructions)

Boiler Blowdown

Boiler Chemical Cleaning

Ash Pond Overflow

Boiler Water Treatment — Evaporator Blowdown

Oil or Coal Fired Plants — Effluent from Air Pollution Control Devices

Condense Cooling Water

Cooling Tower Blowdown

Manufacturing Process

Other

☐ BLBD

☐ BCCL

☐ APOF

☐ EPBD

☐ OCFP

☐ COND

☐ CTBD

☐ MFPR

☐ OTHR

21. Discharge/Receiving Water Temperature Difference

Give the maximum temperature difference between the discharge and receiving waters for summer and winter operating conditions. (see Instructions)

Summer

221a

°F.

Winter

221b

°F.

22. Discharge Temperature, Rate of Change Per Hour

Give the maximum possible rate of temperature change per hour of discharge under operating conditions. (see Instructions)

222

°F./hour

23. Water Temperature, Percentile Report (Frequency of Occurrence)

In the table below, enter the temperature which is exceeded 10% of the year, 5% of the year, 1% of the year and not at all (maximum yearly temperature). (see Instructions)

Frequency of occurrence

a. Intake Water Temperature (Subject to natural changes)

223a

b. Discharge Water Temperature

223b

10%	5%	1%	Maximum
°F	°F	°F	°F
°F	°F	°F	°F

24. Water Intake Velocity (see Instructions)

224

feet/sec.

25. Retention Time Give the length of time, in minutes, from start of water temperature rise to discharge of cooling water. (see Instructions)

225

minutes

FOR AGENCY USE

WA 0037672

Item

Information

Environmental Impact Assessment submitted to DOE

No entries in Col. 1 because chlorine plant reuses surface condenser water from adjacent pulp mill powerhouse which has previously been sand filtered and chlorinated. Additional water up to 1,000 gpm will be supplied from plant site well, permit No. G 2-21657P. All well water to effluent 002.

Chemical Oxygen Demand. Not run because no expectation of increase in passing through plant.

Specific conductances, Col. 2, data from "Limnological Study of Lower Columbia River, 1967-68, Special Scientific Report - Fisheries #610, United States Department of the Interior, United States Fish and Wildlife service, Bureau of Commercial Fisheries, " and one grab test of well water. (260 micro mho/cm)

STANDARD FORM C - MANUFACTURING AND COMMERCIAL

FOR AGENCY USE

WAC037672

SECTION II. BASIC DISCHARGE DESCRIPTION

Complete this section for each discharge indicated in Section I, Item 9, that is to surface waters. This includes discharges to municipal sewerage systems in which the wastewater does not go through a treatment works prior to being discharged to surface waters. Discharges to wells must be described where there are also discharges to surface waters from this facility. SEPARATE DESCRIPTIONS OF EACH DISCHARGE ARE REQUIRED EVEN IF SEVERAL DISCHARGES ORIGINATE IN THE SAME FACILITY. All values for an existing discharge should be representative of the twelve previous months of operation. If this is a proposed discharge, values should reflect best engineering estimates.

ADDITIONAL INSTRUCTIONS FOR SELECTED ITEMS APPEAR IN SEPARATE INSTRUCTION BOOKLET AS INDICATED. REFER TO BOOKLET BEFORE FILLING OUT THESE ITEMS.

1. Discharge Serial No. and Name

a. Discharge Serial No.
(see Instructions)

201a

002

b. Discharge Name
Give name of discharge, if any.
(see Instructions)

201b

c. Previous Discharge Serial No.
If previous permit application
was made for this discharge (see
Item 4, Section I), provide previ-
ous discharge serial number.

201c

2. Discharge Operating Dates

a. Discharge Began Date If the
discharge described below is in
operation, give the date (within
best estimate) the discharge
began.

202a

67 8
YR MO

b. Discharge to Begin Date If the
discharge has never occurred but
is planned for some future date,
give the date (within best esti-
mate) the discharge will begin.

202b

--- ---
YR MO

c. Discharge to End Date If dis-
charge is scheduled to be dis-
continued within the next 5 years,
give the date (within best esti-
mate) the discharge will end.

202c

--- ---
YR MO

3. Engineering Report Available

Check if an engineering report is
available to reviewing agency upon
request. (see Instructions)

203

☒4. Discharge Location Name the
political boundaries within which
the point of discharge is located.

State

204a

Washington

County

204b

Cowlitz

(If applicable) City or Town

204c

N/A

5. Discharge Point Description

Discharge is into (check one):
(see Instructions)

Stream (includes ditches, arroyos,
and other intermittent watercourses)

205a

☒ STR

Lake

☐ LKE

Ocean

☐ OCE

Municipal Sanitary Wastewater
Transport System

☐ MTS

Municipal Combined Sanitary and
Storm Transport System

☐ MCS

Agency Use

204d

204e

204f

Municipal Storm Water Transport System

☐ STS

Well (Injection)

☐ WEL

Other

☐ OTH

If 'other' is checked, specify

6. Discharge Point — Lat/Long Give the precise location of the point of discharge to the nearest second.

Latitude

Longitude

7. Discharge Receiving Water Name Name the waterway at the point of discharge. (see Instructions)

If the discharge is through an outfall that extends beyond the shoreline or is below the mean low water line, complete Item 8.

8. Offshore Discharge

a. Discharge Distance from Shore

b. Discharge Depth Below Water Surface

9. Discharge Type and Occurrence

a. Type of Discharge Check whether the discharge is continuous or intermittent. (see Instructions)

b. Discharge Occurrence Days per Week Enter the average number of days per week (during periods of discharge) this discharge occurs.

c. Discharge Occurrence — Months If this discharge normally operates (either intermittently, or continuously) on less than a year-around basis (excluding shutdowns for routine maintenance), check the months during the year when the discharge is operating. (see Instructions)

Complete Items 10 and 11 if "Intermittent" is checked in Item 9.a. Otherwise, proceed to Item 12.

10. Intermittent Discharge Quantity State the average volume per discharge occurrence in thousands of gallons.

11. Intermittent Discharge Duration and Frequency

a. Intermittent Discharge Duration Per Day State the average number of hours per day the discharge is operating.

b. Intermittent Discharge Frequency State the average number of discharge occurrences per day during days when discharging.

12. Maximum Flow Period Give the time period in which the maximum flow of this discharge occurs.

205b

206a

206b

207a

207b

208a

208b

209a

209b

209c

210

211a

211b

212

46 DEG 07 MIN 40 SEC

122 DEG 59 MIN 20 SEC

Columbia River

For Agency Use

Major	Minor	Sub

207c

For Agency Use

303e

80 feet

19.2 feet Below adopted low water

☒ (con) Continuous☐ (int) Intermittent

7 days per week

☒ JAN ☒ FEB ☒ MAR ☒ APR☒ MAY ☒ JUN ☒ JUL ☒ AUG☒ SEP ☒ OCT ☒ NOV ☒ DEC

N/A thousand gallons per discharge occurrence.

N/A hours per day

N/A discharge occurrences per day

From 7 to 9 month month

FOR AGENCY USE

WA0037672

13. Activity Description Give a narrative description of activity producing this discharge. (See instructions)

213a

Basic industrial inorganic chemical manufacture
based on electrolysis of Sodium Chloride Brine in a
diaphragm cell. Chlorine produced is cooled, dried, compressed; thereafter a part
is consumed in the adjacent Weyerhaeuser pulp mill, another part is reacted with
Sodium Hydroxide to produce Sodium Hypochlorite, and the remainder is liquefied
for rail shipment. All Sodium Hypochlorite produced is consumed in the adjacent
pulp mill. Another cell product, Sodium Hydroxide, is produced as a 50% solution.
Part is shipped by rail, truck or barge, the remainder is diluted to 25% for use
in the adjacent pulp mill and for further dilution to 4% for Sodium Hypochlorite
manufacture.

The cell room, evaporator plant cooling tower, chlorine processing, and sump
water processing are served by this effluent line.

14. Activity Causing Discharge For each SIC Code which describes the activity causing this discharge, supply the type and maximum amount of either the raw material consumed (Item 14a) or the product produced (Item 14b) in the units specified in Table I of the Instruction Booklet. For SIC Codes not listed in Table I, use raw material or production units normally used for measuring production. (see instructions)

a. Raw Materials

SIC Code	Name	Maximum Amount/Day	Unit (See Table I)	Shared Discharges (Serial Number)
(1)	(2)	(3)	(4)	(5)
214a				

b. Products

SIC Code	Name	Maximum Amount/Day	Unit (See Table I)	Shared Discharges (Serial Number)
(1)	(2)	(3)	(4)	(5)
214b				
2812	Sodium Hydroxide	394	K-1	001,002
	Chlorine	349	K-1	001,002

002

FOR AGENCY USE

15. Waste Abatement

- a. Waste Abatement Practices
Describe the waste abatement practices used on this discharge with a brief narrative. (see instructions)

215a

Narrative: Cell room, chlorine drying and evaporator area
have sumps pumped to waste water treatment. Cooling
tower used to reduce heat to effluent and to contain
any entrainment. Warm water will be reused.
Well water used to reduce water demand and effluent
temperature. Effluent monitored for flow, temperature,
residual chlorine, and pH.

- b. Waste Abatement Codes
Using the codes listed in Table II of the Instruction Booklet, describe the waste abatement processes for this discharge in the order in which they occur if possible.

215b

- | | | |
|--------------------|--------------------|--------------------|
| (1) <u>ESEPAR</u> | (2) <u>ESEGRE</u> | (3) <u>EMERGE</u> |
| (4) <u>DHYSIC</u> | (5) <u>RECOVE</u> | (6) <u>RECYCL</u> |
| (7) <u>RHEATR</u> | (8) <u>REVAPO</u> | (9) <u>LOCALS</u> |
| (10) <u>OMONIT</u> | (11) <u>POTHER</u> | (12) <u>CNEUTR</u> |
| (13) _____ | (14) _____ | (15) _____ |
| (16) _____ | (17) _____ | (18) _____ |
| (19) _____ | (20) _____ | (21) _____ |
| (22) _____ | (23) _____ | (24) _____ |
| (25) _____ | | |

WA0037672

16. Wastewater Characteristics

Check the box beside each constituent which is present in the effluent (discharge water). This determination is to be based on actual analysis or best estimate. (see instructions)

Parameter 216	Present	Parameter 216	Present
Color 00080		Copper 01042	
Ammonia 00510		Iron 01045	X
Organic nitrogen 00605		Lead 01051	
Nitrate 00620		Magnesium 01057	X
Nitrite 00615		Manganese 01055	X
Phosphorus 00665	X	Mercury 01060	X
Sulfate 00945	X	Molybdenum 01062	
Sulfide 00745		Nickel 01067	
Sulfite 00740		Selenium 01147	
Bromide 01870		Silver 01077	
Chloride 00940	X	Potassium 00937	
Cyanide 00700		Sodium 00929	X
Fluoride 00951		Thallium 01059	
Aluminum 01105		Titanium 01152	
Antimony 01097		Tin 01102	
Arsenic 01002		Zinc 01092	X
Beryllium 01012		Algicides* 74051	
Barium 01007		Chlorinated organic compounds* 74052	
Boron 01022		Pesticides* 74053	
Cadmium 01027		Oil and grease 00550	
Calcium 00916	X	Phenols 32730	
Cobalt 01037		Surfactants 38260	
Chromium 01034		Chlorine 50060	X
Fecal coliform bacteria 74055		Radioactivity* 74050	

*Specify substances, compounds and/or elements in Item 26.

Pesticides (insecticides, fungicides, and rodenticides) must be reported in terms of the acceptable common names specified in *Acceptable Common Names and Chemical Names for the Ingredient Statement on Pesticide Labels*, 2nd Edition, Environmental Protection Agency, Washington, D.C. 20250, June 1972, as required by Subsection 162.7(b) of the Regulations for the Enforcement of the Federal Insecticide, Fungicide, and Rodenticide Act.

17. Description of Intake and Discharge

For each of the parameters listed below, enter in the appropriate box the value or code letter answer called for. (see instructions)

In addition, enter the parameter name and code and all required values for any of the following parameters if they were checked in Item 16: ammonia, cyanide, aluminum, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, phenols, oil and grease, and chlorine (residual).

Parameter and Code 217a	Influent		Effluent					
	Untreated Intake Water (Daily Average)	In-Plant Treated Intake Water (Daily Average)	Daily Average	Minimum Value Observed or Expected During Discharge Activity	Maximum Value Observed or Expected During Discharge Activity	Frequency of Analysis	Number of Analyses	Sample Type
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Flow* Gallons per day 00056		2,800,000	2,800,000	2,000,000	3,900,000	CONT.	365	N/A
pH Units 00400		6.9	X	6	9	CONT.	365	N/A
Temperature (winter) ° F 74028		51	65	55	80	CONT.	365	N/A
Temperature (summer) ° F 74027		62	85	75	95	CONT.	365	N/A
Biochemical Oxygen Demand (BOD 5-day) mg/l 00310	26	1	1	1	2	1/365	1	G
Chemical Oxygen Demand (COD) mg/l 00340	ITEM		SEE	ITEM	26	1/365	1	G
Total Suspended (nonfilterable) Solids mg/l 00530	SEE	2	5	1	10	1/365	1	G
Specific Conductance micromhos/cm at 25° C 00095		300	X	120	1,000	1/90	4	2160
Settleable Matter (residue) ml/l 00545		0	0	0	0.1	1/365	1	G

*Other discharges sharing intake flow (serial numbers). (see instructions)

WA00031672

17. (Cont'd.)

Parameter and Code 227a	Influent		Effluent					
	Untreated Intake Water (Daily Average) (1)	In-Plant Treated Intake Water (Daily Average) (2)	Daily Average (3)	Minimum Value Observed or Expected During Discharge Activity (4)	Maximum Value Observed or Expected During Discharge Activity (5)	Frequency of Analysis (6)	Number of Analyses (7)	Sample Type (8)
Chlorine residual, mg/l		1.5	1.5	1	5	CONT.	365	N/A
Zinc, mg/l		0.002	0.1	0.001	0.2	1/90	4	2160
Mercury, mg/l		<0.001	<0.001	<0.001	0.002	1/90	4	24

Plant Controls Check if the following plant controls are available for this discharge.

Alternate power source for major pumping facility.

Alarm or emergency procedure for power or equipment failure

Complete item 19 if discharge is from cooling and/or steam water generation and water treatment additives are used.

19. Water Treatment Additives If the discharge is treated with any conditioner, inhibitor, or algicide, answer the following:

a. Name of Material(s)

b. Name and address of manufacturer

c. Quantity (pounds added per million gallons of water treated).

218

☐ APS

☒ ALM

219a

Nalco 936 and 937, Zinc Phosphate

219b

Nalco

180 N. Michigan

Chicago, Ill. 60601

219c

8 See item 26

d. Chemical composition of these additives (see instructions).

219d

Zinc Phosphate

Complete items 20-25 if there is a thermal discharge (e.g., associated with a steam and/or power generation plant, steel mill, petroleum refinery, or any other manufacturing process) and the total discharge flow is 10 million gallons per day or more. (see instructions)

20. Thermal Discharge Source Check the appropriate item(s) indicating the source of the discharge. (see instructions)

Boiler Blowdown

Boiler Chemical Cleaning

Ash Pond Overflow

Boiler Water Treatment — Evaporator Blowdown

Oil or Coal Fired Plants — Effluent from Air Pollution Control Devices

Condense Cooling Water

Cooling Tower Blowdown

Manufacturing Process

Other

☐ BLBD☐ BCCL☐ APOF☐ EPBD☐ OCFP☐ COND☐ CTBD☐ MFPR☐ OTHR

21. Discharge/Receiving Water Temperature Difference

Give the maximum temperature difference between the discharge and receiving waters for summer and winter operating conditions. (see instructions)

Summer

221a

°F.

Winter

221b

°F.

22. Discharge Temperature, Rate of Change Per Hour

Give the maximum possible rate of temperature change per hour of discharge under operating conditions. (see instructions)

222

°F./hour

23. Water Temperature, Percentile Report (Frequency of Occurrence)

In the table below, enter the temperature which is exceeded 10% of the year, 5% of the year, 1% of the year and not at all (maximum yearly temperature). (see instructions)

Frequency of occurrence

a. Intake Water Temperature (Subject to natural changes)

223a

b. Discharge Water Temperature

223b

10%	5%	1%	Maximum
°F	°F	°F	°F
°F	°F	°F	°F

24. Water Intake Velocity (see instructions)

224

feet/sec.

25. Retention Time Give the length of time, in minutes, from start of water temperature rise to discharge of cooling water. (see instructions)

225

minutes

STANDARD FORM C - MANUFACTURING AND COMMERCIAL

SECTION III. WASTE ABATEMENT REQUIREMENTS & IMPLEMENTATION (CONSTRUCTION) SCHEDULE

This section requires information on any uncompleted implementation schedule which may have been imposed for construction of waste abatement facilities. Such requirements and implementation schedules may have been established by local, State, or Federal agencies or by court action. In addition to completing the following items, a copy of an official implementation schedule should be attached to this application. IF YOU ARE SUBJECT TO SEVERAL DIFFERENT IMPLEMENTATION SCHEDULES, EITHER BECAUSE OF DIFFERENT LEVELS OF AUTHORITY IMPOSING DIFFERENT SCHEDULES (Item 1a.) AND/OR STAGED CONSTRUCTION OF SEPARATE OPERATION UNITS (Item 1c), SUBMIT A SEPARATE SECTION III FOR EACH ONE.

1. Improvements

- a. Discharge Serial Number
Affected List the discharge serial numbers, assigned in Section II, that are covered by this implementation schedule.

- b. Authority Imposing Requirements Check the appropriate item indicating the authority for implementation schedule. If the identical implementation schedule has been ordered by more than one authority, check the appropriate items. (see instructions)

Locally developed plan

Areawide Plan

Basic Plan

State approved implementation schedule

Federal approved water quality standards implementation plan.

Federal enforcement procedure or action

State court order

Federal court order

- c. Facility Requirement. Specify the 3-character code of those listed below that best describes in general terms the requirement of the implementation schedule and the applicable six-character abatement code(s) from Table II of the instruction booklet. If more than one schedule applies to the facility because of a staged construction schedule, state the stage of construction being described here with the appropriate general action code. Submit a separate Section III for each stage of construction planned.

300

301a

001 002

301b

☐ LOC☐ ARE☐ BAS☐ SQS☐ WQS☐ ENF☐ CRT☐ FED

301c

3-character
(general)

301d

6-character
(specific)
(see Table II)

FOR AGENCY USE

SCHED. NO.

New Facility

NEW

Modification (no increase in capacity or treatment)

MOD

Increase in Capacity

INC

Increase in Treatment Level

INT

Both Increase in Treatment Level and Capacity

ICT

Process Change

PRO

Elimination of Discharge

ELI

2. Implementation Schedule and 3. Actual Completion Dates

Provide dates imposed by schedule and any actual dates of completion for implementation steps listed below. Indicate dates as accurately as possible. (see instructions)

Implementation Steps

2. Schedule (Yr./Mo./Day)

3. Actual Completion (Yr./Mo./Day)

a. Preliminary plan complete

302a / /

303a / /

b. Final plan submission

302b / /

303b / /

c. Final plan complete

302c / /

303c / /

d. Financing complete & contract awarded

302d / /

303d / /

e. Site acquired

302e / /

303e / /

f. Begin action (e.g., construction)

302f / /

303f / /

g. End action (e.g., construction)

302g / /

303g / /

h. Discharge Began

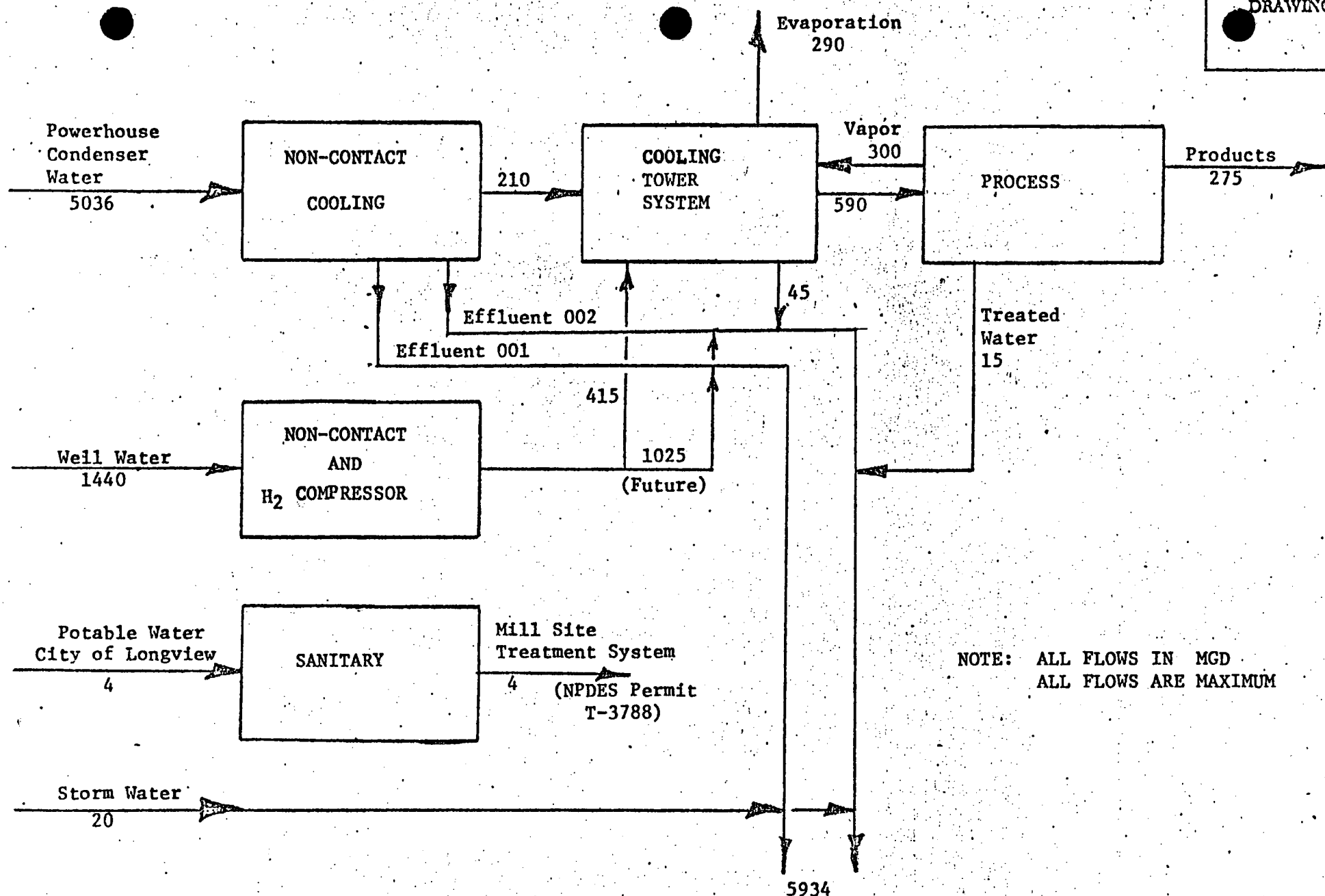
302h / /

303h / /

i. Operational level attained

302i / /

303i / /



NOTE: ALL FLOWS IN MGD
ALL FLOWS ARE MAXIMUM



Weyerhaeuser Company
Pulp and Paperboard Division
Longview, Washington

SCHEMATIC OF WATER FLOW
WEYERHAEUSER CHLORINE PLANT
LONGVIEW, WASHINGTON, COWLITZ COUNTY
JUNE 3, 1974

PAGE 1 of 1

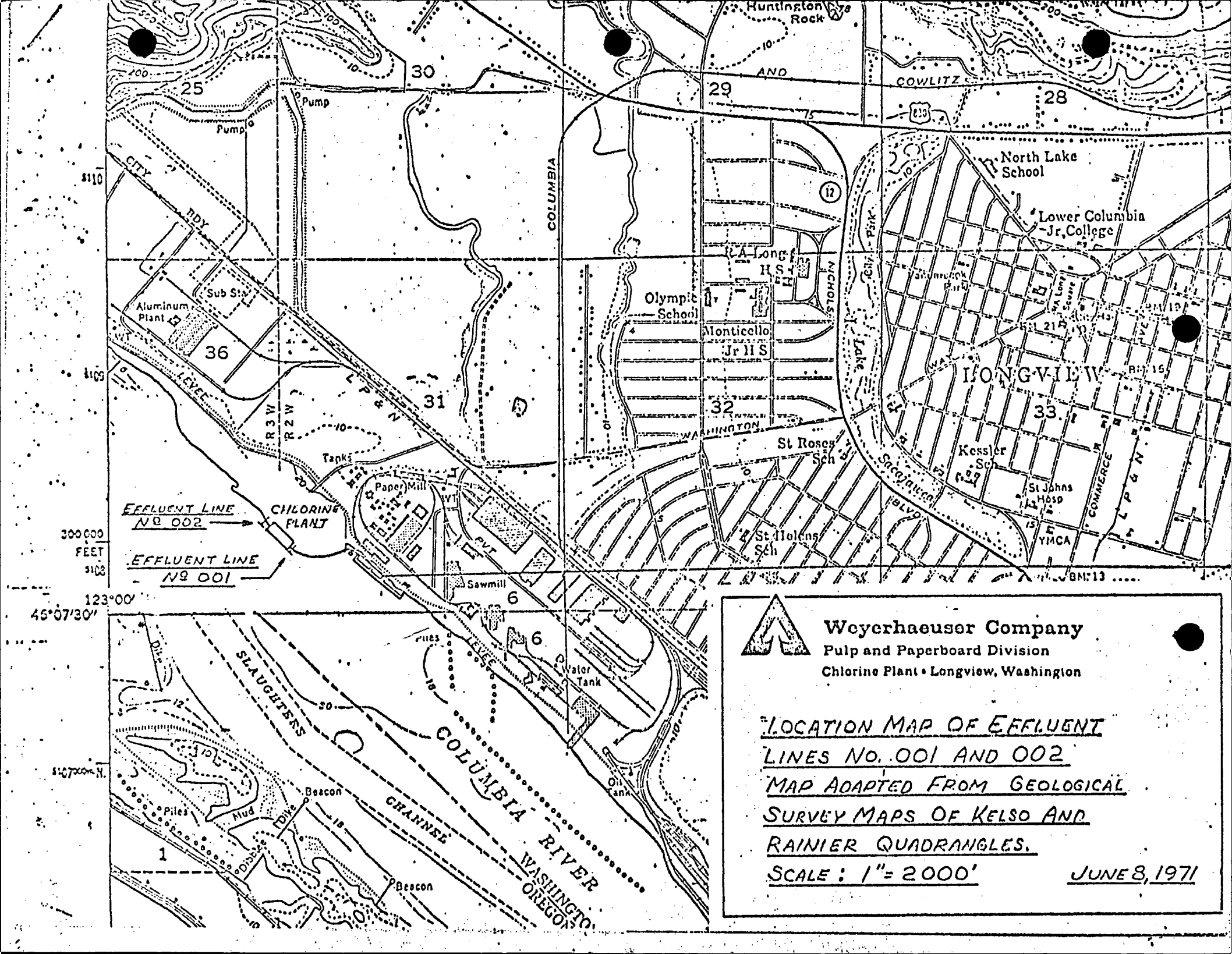
Drawn By _____

Date _____

Scale _____

DRAWING NO.

-A



Weyerhaeuser Company
Pulp and Paperboard Division
Chlorine Plant • Longview, Washington

LOCATION MAP OF EFFLUENT
LINES NO. 001 AND 002
MAP ADAPTED FROM GEOLOGICAL
SURVEY MAPS OF KELSO AND
RAINIER QUADRANGLES.

SCALE: 1" = 2000'

JUNE 8, 1971



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE WA 02 SITE NUMBER 0009041450

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site) Weyerhaeuser Chlor-Alkali Plant		02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER 3000 Industrial Way				
03 CITY Longview		04 STATE WA	05 ZIP CODE 98632	06 COUNTY Cowlitz	07 COUNTY CODE 015	08 CONG DIST 03
09 COORDINATES LATITUDE 46 07 46 LONGITUDE 122 59 24		10 TYPE OF OWNERSHIP (Check one) <input checked="" type="checkbox"/> A. PRIVATE <input type="checkbox"/> B. FEDERAL <input type="checkbox"/> C. STATE <input type="checkbox"/> D. COUNTY <input type="checkbox"/> E. MUNICIPAL <input type="checkbox"/> F. OTHER <input type="checkbox"/> G. UNKNOWN				

III. INSPECTION INFORMATION

01 DATE OF INSPECTION 9 / 30 86 MONTH DAY YEAR	02 SITE STATUS <input checked="" type="checkbox"/> ACTIVE <input type="checkbox"/> INACTIVE	03 YEARS OF OPERATION 1956 Present UNKNOWN BEGINNING YEAR ENDING YEAR	
04 AGENCY PERFORMING INSPECTION (Check all that apply) <input checked="" type="checkbox"/> A. EPA <input type="checkbox"/> B. EPA CONTRACTOR <input type="checkbox"/> C. MUNICIPAL <input type="checkbox"/> D. MUNICIPAL CONTRACTOR <input checked="" type="checkbox"/> E. STATE <input type="checkbox"/> F. STATE CONTRACTOR <input type="checkbox"/> G. OTHER			

05 CHIEF INSPECTOR Michael J. Spencer	06 TITLE Environmentalist 3	07 ORGANIZATION Ecology	08 TELEPHONE NO. (206) 459-6516
09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO. ()
			()
			()
			()
			()

13 SITE REPRESENTATIVES INTERVIEWED Robert Anderson	14 TITLE Manager	15 ADDRESS Weyerhaeuser Co., Tacoma	16 TELEPHONE NO. (206) 924-5333
Jim Fisher	Aq. Toxicol.	Weyerhaeuser Co., Tacoma	(206) 924-6825
Don Work	Eng. Tech Supt	Weyerhaeuser Co, Longview	(206) 425-2150
			()
			()
			()

17 ACCESS GAINED BY (Check one) <input checked="" type="checkbox"/> PERMISSION <input type="checkbox"/> WARRANT	18 TIME OF INSPECTION 1000-1220	19 WEATHER CONDITIONS Overcast, light misty rain, no wind, 50°F
--	------------------------------------	--

IV. INFORMATION AVAILABLE FROM

01 CONTACT Michael J. Spencer	02 OF (Agency/Organization) Ecology		03 TELEPHONE NO. (206) 459-6516
04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM As Above	05 AGENCY -	06 ORGANIZATION -	07 TELEPHONE NO. -
			08 DATE 11 / 26 / 86 MONTH DAY YEAR



☐ I. HIGHLY VOLATILE
☐ J. EXPLOSIVE
☐ K. REACTIVE
☐ L. INCOMPATIBLE
☐ M. NOT APPLICABLE

EPA FORM 2070-13 (7-81)

EPA SITE INSPECTION
FORM



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE WA 02 SITE NUMBER D009041450

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION 0 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Although mercury-contaminated sludges were stored in unlined brine ponds between mid 50's-early 70's, no contamination of groundwater by mercury has been observed. (see Weyerhaeuser July 1986 report, Appendix A).

01 ☒ B. SURFACE WATER CONTAMINATION 0 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Prior to April, 1970, mercury-containing process wastes were discharged directly to Columbia River, an Interstate Navigable Water. Mercury concentration drastically reduced within months, eliminate in early 1970's.

01 ☒ C. CONTAMINATION OF AIR 0 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

No significant contamination of air through present operations, although past chlor-alkali process had some release of mercury to the environment through vaporization. Process no longer used.

01 ☒ D. FIRE/EXPLOSIVE CONDITIONS 0 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

None known nor suspected, as observed in 9/30/86 SI.

01 ☒ E. DIRECT CONTACT 0 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Past suspected on-site waste disposal included approx. 2000 cu. yds. of mercury contaminated sludges-covered with dredge spoils. No known or suspected present direct contact potential.

01 ☒ F. CONTAMINATION OF SOIL 22 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: _____ (ACRES) 04 NARRATIVE DESCRIPTION

Surficial samples (2' deep) on west side of site showed up to 16 ppm Hg, and averaged 26.5 ppm on east side (5' deep); Weyerhaeuser reported Appendix A (also see above).

01 ☒ G. DRINKING WATER CONTAMINATION 0 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

No known potential, as site is 3 miles downgradient Longview Municipal Water supply. On-site wells, screened at 172 feet, used only for industrial purposes.

01 ☒ H. WORKER EXPOSURE/INJURY 0 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

None known or suspected (by mercury from past used process) although present process uses caustics and other potentially hazardous materials regulated by Labor and Industries.

01 ☒ I. POPULATION EXPOSURE/INJURY Unk. 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Off-site sediments and fish tissue samples show only slightly higher mercury concentration than up or downstream, although absolute values are well within safe environmental limits.



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
WA 0009041450

II. HAZARDOUS CONDITIONS AND INCIDENTS *(Continued)*

01 ☒ J. DAMAGE TO FLORA 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported, or observed during SI.

01 ☒ K. DAMAGE TO FAUNA 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION *(Include name, s. or species)*

None reported or observed during SI.

01 ☒ L. CONTAMINATION OF FOOD CHAIN 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Mercury is known to bioaccumulate and biomagnify. (See also I.)

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES 02 ☐ OBSERVED (DATE: 8/3/70) ☐ POTENTIAL ☐ ALLEGED
(Spills Runoff Standing liquids Leaking drums)
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Mercury contaminated wastes were stored in unlined on-site ponds scooped out of sandy river deposits.

01 ☒ N. DAMAGE TO OFFSITE PROPERTY 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None described nor observed.

01 ☒ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs 02 ☒ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Weyerhaeuser measured slight contamination levels of mercury in drainage ditch leading to sump.

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None (recently) reported or observed during SI.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

None suspected.

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

A. cleanup of the main contaminated brine ponds area occurred in the mid-70's, however current sampling indicates some residual surficial soil mercury contamination (16-27 ppm).

V. SOURCES OF INFORMATION *(Cite specific references, e.g. State files, sample analysis, reports)*

Ecology 9/30/86 SI
PA files.



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE WA 02 SITE NUMBER D009041450

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
<input type="checkbox"/> A. NPDES	#3450 WA-003767-2	3-16-70 1-2-79	1-30-76 8-31-81	
<input type="checkbox"/> B. UIC				
<input type="checkbox"/> C. AIR Southwest Air Pollution Control				Auth. #80-CN-65 4-30-80 --
<input type="checkbox"/> D. RCRA				
<input type="checkbox"/> E. RCRA INTERIM STATUS				
<input type="checkbox"/> F. SPCC PLAN	with WA-000012-4			
<input type="checkbox"/> G. STATE (Specify)				
<input type="checkbox"/> H. LOCAL (Specify)				
<input type="checkbox"/> I. OTHER (Specify)				
<input type="checkbox"/> J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE	04 TREATMENT (Check all that apply)	05 OTHER
<input type="checkbox"/> A. SURFACE IMPOUNDMENT			<input type="checkbox"/> A. INCENERATION	<input checked="" type="checkbox"/> A. BUILDINGS ON SITE
<input type="checkbox"/> B. PILES			<input type="checkbox"/> B. UNDERGROUND INJECTION	
<input type="checkbox"/> C. DRUMS, ABOVE GROUND			<input type="checkbox"/> C. CHEMICAL/PHYSICAL	
<input type="checkbox"/> D. TANK, ABOVE GROUND			<input type="checkbox"/> D. BIOLOGICAL	
<input type="checkbox"/> E. TANK, BELOW GROUND			<input type="checkbox"/> E. WASTE OIL PROCESSING	
<input type="checkbox"/> F. LANDFILL			<input type="checkbox"/> F. SOLVENT RECOVERY	06 AREA OF SITE
<input type="checkbox"/> G. LANDFARM			<input type="checkbox"/> G. OTHER RECYCLING/RECOVERY	22 (Acres)
<input type="checkbox"/> H. OPEN DUMP			<input type="checkbox"/> H. OTHER (Specify)	
<input checked="" type="checkbox"/> I. OTHER Burial (Specify)	Est 1420 lb Mercury			
	in 2000 cu. yd. Rubble			

07 COMMENTS

Plant employed mercury - based chlor-alkali process from 1956-1975. Discharged mercury contaminated process wastes into Columbia River until forced to stop in 1970, then discharged to unlined on-site pond. Ecology oversaw pond cleanup 1973-1977.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)
☒ A. ADEQUATE, SECURE Now ☐ B. MODERATE ☒ C. INADEQUATE, POOR Prev. ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

Previously discharge pond was unlined, wastes are now treated and discharged through pulp mill NPDES permitted discharge to Columbia River.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☐ YES ☒ NO
02 COMMENTS

Area covered by packed gravel (parking/storage lot).

VI. SOURCES OF INFORMATION (Cite specific references e.g. site logs, sample analysis reports)

Ecology 9-30-86 SI
Ecology PA files, Ken Johnson Personal Commun.



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
01 STATE 02 SITE NUMBER
WA D009041450

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY
(Check as applicable)

	SURFACE	WELL
COMMUNITY	A. <input checked="" type="checkbox"/>	B. <input type="checkbox"/>
NON-COMMUNITY	C. <input type="checkbox"/>	D. <input checked="" type="checkbox"/>

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A. <input type="checkbox"/>	B. <input type="checkbox"/>	C. <input checked="" type="checkbox"/>
D. <input type="checkbox"/>	E. <input type="checkbox"/>	F. <input type="checkbox"/>

03 DISTANCE TO SITE

A. 3 (mi)
B. > 71 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A. ONLY SOURCE FOR DRINKING
☐ B. DRINKING
(Other sources available)
COMMERCIAL, INDUSTRIAL, IRRIGATION
(No other water sources available)
☒ C. COMMERCIAL, INDUSTRIAL, IRRIGATION
(Limited other sources available)
☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER Unk

03 DISTANCE TO NEAREST DRINKING WATER WELL >1 (mi)

04 DEPTH TO GROUNDWATER

180 (ft)

05 DIRECTION OF GROUNDWATER FLOW

SW

06 DEPTH TO AQUIFER
OF CONCERN

180 (ft)

07 POTENTIAL YIELD
OF AQUIFER

Unk (gpd)

08 SOLE SOURCE AQUIFER

☐ YES ☒ NO

09 DESCRIPTION OF WELLS (including useage, depth, and location relative to population and buildings)

Two onsite production wells - just to SE of west side. Drilled to hard pan (202 feet), cased to 170-180 feet.

10 RECHARGE AREA

☐ YES
☒ NO

COMMENTS

11 DISCHARGE AREA

☒ YES
☐ NO

COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☐ A. RESERVOIR, RECREATION
DRINKING WATER SOURCE
☒ B. IRRIGATION, ECONOMICALLY
IMPORTANT RESOURCES
☐ C. COMMERCIAL, INDUSTRIAL
☐ D. NOT CURRENTLY USED

02 AFFECTED POTENTIALLY AFFECTED BODIES OF WATER

NAME:

Columbia River

AFFECTED

☐

DISTANCE TO SITE

<0.1

(mi)

☐

(mi)

☐

(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE
A. 500
NO OF PERSONS

TWO (2) MILES OF SITE
B. 6000
NO OF PERSONS

THREE (3) MILES OF SITE
C. 30,000
NO OF PERSONS

02 DISTANCE TO NEAREST POPULATION

<1

(mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE

Unk

04 DISTANCE TO NEAREST OFF-SITE BUILDING

<1

(mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site e.g., rural, village, densely populated urban area)

The chlorine plant is part of a large Weyerhaeuser industrial complex along Industrial Way, immediately south of Longview/Kelso, Washington, total population 41,000.



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

C1 STATE WA C2 SITE NUMBER D009041450

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☒ C. $10^{-4} - 10^{-3}$ cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☒ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☐ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK

5-10 (ft)

04 DEPTH OF CONTAMINATED SOIL ZONE

2-5 (ft)

05 SOIL pH

6.1-7.3

06 NET PRECIPITATION

>15 (in)

07 ONE YEAR 24 HOUR RAINFALL

>3 (in)

08 SLOPE
SITE SLOPE

1 %

DIRECTION OF SITE SLOPE

S to SW

TERRAIN AVERAGE SLOPE

1 %

09 FLOOD POTENTIAL

10

SITE IS IN 100 YEAR FLOODPLAIN

☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE

A. N/A (mi)

OTHER

B. (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

(mi)

ENDANGERED SPECIES: N/A

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL

RESIDENTIAL AREAS; NATIONAL/STATE PARKS,
FORESTS, OR WILDLIFE RESERVES

AGRICULTURAL LANDS
PRIME AG LAND AG LAND

A. On-site(mi)

B. <1 (mi)

C. 2 (mi) D. <1 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

The chlorine plant is on a flat area just down river of Mt. Coffin landmark and SW of the city of Longview. The SW border is the Columbia River. There are two sites involved in the SI - the former brine pond area to the east of the cell building, and about 1 acre to the NW of the two production wells, west of the cell building.

VII. SOURCES OF INFORMATION (Cite specific references e.g., State files, sample analysis reports)

Ecology Industrial PA files
Ecology 9/30/86 SI.



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
WA D009041450

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	(See Below)		
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
	(See Below)

IV. PHOTOGRAPHS AND MAPS

01 TYPE <input checked="" type="checkbox"/> GROUND <input type="checkbox"/> AERIAL	02 IN CUSTODY OF <u>Ecology</u> <small>(Name of organization or individual)</small>
03 MAPS <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	04 LOCATION OF MAPS <u>Ecology</u>

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

On-site inspection made 9/30/86. Discussed Weyerhaeuser's February 18-20, 1986 sampling survey which included -
15 River water and 15 river sediment samples
18 On-site soil samples at various soil depths (5 locations)
3 Surface water, 2 groundwater samples, and
18 Fish tissue samples.

VI. SOURCES OF INFORMATION (Cite specific references, e.g., State files, sample analysis reports)

Weyerhaeuser July, 1986 Report
Ecology 9/30/86 SI



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE WA 02 SITE NUMBER D009041450

II. CURRENT OWNER(S)

01 NAME Weyerhaeuser Company			02 D+B NUMBER			08 NAME Weyerhaeuser Company			09 D+B NUMBER 00-130-6992								
03 STREET ADDRESS (P.O. Box, RFD #, etc.) P.O. Box 188			04 SIC CODE 2819			10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE								
05 CITY Longview			06 STATE WA			07 ZIP CODE 98682			12 CITY Tacoma			13 STATE WA			14 ZIP CODE 98477		
01 NAME			02 D+B NUMBER			08 NAME			09 D+B NUMBER								
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE			10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE								
05 CITY			06 STATE			07 ZIP CODE			12 CITY			13 STATE			14 ZIP CODE		
01 NAME			02 D+B NUMBER			08 NAME			09 D+B NUMBER								
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE			10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE								
05 CITY			06 STATE			07 ZIP CODE			12 CITY			13 STATE			14 ZIP CODE		
01 NAME			02 D+B NUMBER			08 NAME			09 D+B NUMBER								
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE			10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE								
05 CITY			06 STATE			07 ZIP CODE			12 CITY			13 STATE			14 ZIP CODE		
01 NAME			02 D+B NUMBER			08 NAME			09 D+B NUMBER								
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE			10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE								
05 CITY			06 STATE			07 ZIP CODE			12 CITY			13 STATE			14 ZIP CODE		

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME			02 D+B NUMBER			01 NAME			02 D+B NUMBER					
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE			03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE					
05 CITY			06 STATE			05 CITY			06 STATE			07 ZIP CODE		
01 NAME			02 D+B NUMBER			01 NAME			02 D+B NUMBER					
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE			03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE					
05 CITY			06 STATE			05 CITY			06 STATE			07 ZIP CODE		
01 NAME			02 D+B NUMBER			01 NAME			02 D+B NUMBER					
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE			03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE					
05 CITY			06 STATE			05 CITY			06 STATE			07 ZIP CODE		

IV. REALTY OWNER(S) (if applicable, list most recent first)

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis reports)

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

Q1 STATE WA Q2 SITE NUMBER D009041450

II. CURRENT OPERATOR (Provide if different from owner)

OPERATOR'S PARENT COMPANY (If applicable)

01 NAME Weyerhaeuser Company	02 D+B NUMBER 00-130-6992	10 NAME	11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.) P.O. Box 188	04 SIC CODE 2819	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
05 CITY Longview	06 STATE WA	07 ZIP CODE 98632	14 CITY
08 YEARS OF OPERATION 20	09 NAME OF OWNER Weyerhaeuser Company	15 STATE	16 ZIP CODE

III. PREVIOUS OPERATOR(S) (List most recent first, provide only if different from owner)

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD	15 STATE	16 ZIP CODE
01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD	15 STATE	16 ZIP CODE
01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD	15 STATE	16 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)



C1 STATE WA	C2 SITE NUMBER D009041450
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01 NAME		02 D+B NUMBER	
03 STREET ADDRESS (P.O. box, RFD, etc.)		04 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE	

01 NAME		02 D+B NUMBER		01 NAME		02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE
05 CITY		06 STATE	07 ZIP CODE		05 CITY		06 STATE
05 CITY		06 STATE	07 ZIP CODE		05 CITY		06 STATE
01 NAME		02 D+B NUMBER		01 NAME		02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE
05 CITY		06 STATE	07 ZIP CODE		05 CITY		06 STATE

01 NAME			02 D+B NUMBER			01 NAME			02 D+B NUMBER										
03 STREET ADDRESS (P.O. Box, RFD #, etc.)						04 SIC CODE			03 STREET ADDRESS (P.O. Box, RFD #, etc.)						04 SIC CODE				
05 CITY				06 STATE		07 ZIP CODE				05 CITY				06 STATE		07 ZIP CODE			
01 NAME						02 D+B NUMBER			01 NAME						02 D+B NUMBER				
03 STREET ADDRESS (P.O. Box, RFD #, etc.)						04 SIC CODE			03 STREET ADDRESS (P.O. Box, RFD #, etc.)						04 SIC CODE				
05 CITY				06 STATE		07 ZIP CODE				05 CITY				06 STATE		07 ZIP CODE			

10



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE WA 02 SITE NUMBER 0009041450

II. PAST RESPONSE ACTIVITIES

01 <input type="checkbox"/> A. WATER SUPPLY CLOSED 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> B. TEMPORARY WATER SUPPLY PROVIDED 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> C. PERMANENT WATER SUPPLY PROVIDED 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> D. SPILLED MATERIAL REMOVED 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input checked="" type="checkbox"/> E. CONTAMINATED SOIL REMOVED 04 DESCRIPTION All contents of mercury brine sludge ponds and all other mercury contaminated materials from the 1975 process conversion were transported to Chem-Nuclear hazardous waste disposal site at Arlington, Oregon.	02 DATE <u>1976.2-1977.2</u>	03 AGENCY <u>WA Dept. of Ecology</u>
01 <input checked="" type="checkbox"/> F. WASTE REPACKAGED 04 DESCRIPTION See above explanation	02 DATE <u>1976.2-1977.2</u>	03 AGENCY <u>WA Dept. of Ecology</u>
01 <input checked="" type="checkbox"/> G. WASTE DISPOSED ELSEWHERE 04 DESCRIPTION See above explanation	02 DATE <u>1976.2-1977.2</u>	03 AGENCY <u>WA Dept. of Ecology</u>
01 <input checked="" type="checkbox"/> H. ON SITE BURIAL 04 DESCRIPTION An estimated 1420 lbs of mercury in 2000 cu. yd. of rubble is thought to be buried on the facility property.	02 DATE <u>1956-1970</u>	03 AGENCY _____
01 <input type="checkbox"/> I. IN SITU CHEMICAL TREATMENT 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> J. IN SITU BIOLOGICAL TREATMENT 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> K. IN SITU PHYSICAL TREATMENT 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> L. ENCAPSULATION 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> M. EMERGENCY WASTE TREATMENT 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> N. CUTOFF WALLS 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> O. EMERGENCY DIKING/SURFACE WATER DIVERSION 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> P. CUTOFF TRENCHES/SUMP 04 DESCRIPTION	02 DATE _____	03 AGENCY _____
01 <input type="checkbox"/> Q. SUBSURFACE CUTOFF WALL 04 DESCRIPTION	02 DATE _____	03 AGENCY _____



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
WA D009041450

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

01 ☐ S. CAPPING/COVERING
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

01 ☐ T. BULK TANKAGE REPAIRED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

01 ☐ U. GROUT CURTAIN CONSTRUCTED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

01 ☐ V. BOTTOM SEALED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

01 ☐ W. GAS CONTROL
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

01 ☐ X. FIRE CONTROL
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

01 ☐ Y. LEACHATE TREATMENT
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

01 ☐ Z. AREA EVACUATED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

01 ☐ 1. ACCESS TO SITE RESTRICTED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

01 ☐ 2. POPULATION RELOCATED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

01 ☒ 3. OTHER REMEDIAL ACTIVITIES
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

1) 1970.3 Chlor-alkali production process modification (mercury-cell) to significantly reduce mercury losses to the environment--response to U.S. Attorneys Consent Order.

2) 1975.2 Abandonment of Chlor alkali mercury-based production process in favor of diaphragm-cell technology--response to WA Dept. of Ecology NPDES permit and EPA NESHAPS regulations and consent order.

3) 1976.2-1977.2 Disposal of all mercury contaminated solid wastes at Chem-Nuclear's Arlington, Oregon Facility.

III. SOURCES OF INFORMATION (Cite specific references, e.g., State files, sample analysis reports)

1) EPA Consent Order

2) NPDES permits

3) Weyerhaeuser - Department of Ecology Correspondence



POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION

01 STATE WA 02 SITE NUMBER D009041450

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY ENFORCEMENT ACTION ☒ YES ☐ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY ENFORCEMENT ACTION

- 10/15/70 Sipulation agreement between U.S. Attorneys Office and Weyerhaeuser which comitted the company to:
- 1) reduce mercury effluent losses to 0.5lb/day for plants 1 and 2
 - 2) monitor effluent for mercury concentration
 - 3) identify a schedule for future reductions of effluent mercury.
- 3-16-73 Washington Department of Ecology issues NPDES permit #3450 which establishes effluent limits for mercury discharge at 0.2lb/day (each plant) until 1-1-76, and 0.1lb/day (each plant) thereafter.
- 7-5-73 EPA grants a "Waiver of Compliance" with mercury standard of the National Emission standards for Hazardous Air Pollutants for Weyerhaeuser's Longview facility. The consent order requires conversion or shutdown of the mercury-based chlor-alkali production process by 3-31-75.
- 2-75 Washington Department of Ecology issues NPDES #WA-0037672-2 which establishes mercury effluent discharge limits at 0.002mg/l following shutdown of mercury-based process in 1975.2.
- 4-10-75 Based on Weyerhaeuser's request, EPA extends the NESHAPS consent order to 7-1-75.
- 5-2-75 Weyerhaeuser completes shutdown of mercury-based chlor-alkali production process, and starts up diaphragm-cell production technology.
- 4-9-76 Weyerhaeuser commits to the Washington Department of Ecology that all mercury-contaminated solid wastes stored on the plant site will be disposed of at Chem-Nuclear's hazardous waste disposal site at Arlington, Oregon.
- 5/76-4/77 Disposal of 24012+ tons of mercury contaminated solid waste at chem-nuclear, Arlington, Oregon.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

- 1) Legal Consent Orders
- 2) NPDES Permits
- 3) Weyerhaeuser-Environmental Agency Correspodence
- 4) Contract Invoices



POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

IDENTIFICATION
01 STATE 02 SITE NUMBER
WA WAD009041450

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site) Weyerhaeuser Co. Chlor-Alkali Plant		02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER 3000 Industrial Way			
03 CITY Longview	04 STATE WA	05 ZIP CODE 98632	06 COUNTY Cowlitz	07 COUNTY CODE	08 CONG DIST
09 COORDINATES LATITUDE 46 07' 46"		LONGITUDE 122 59' 24"			
10 DIRECTIONS TO SITE (Starting from nearest public road) Sect. 31, Twn. 8N, R-2W 3 miles from city of longview, off of Washington way.					

III. RESPONSIBLE PARTIES

01 OWNER (if known) Weyerhaeuser Company		02 STREET (Business, mailing, residential) PO Box 188			
03 CITY Longview	04 STATE Wa	05 ZIP CODE 98632	06 TELEPHONE NUMBER 2064252150		
07 OPERATOR (if known and different from owner) same		08 STREET (Business, mailing, residential)			
09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER ()		
13 TYPE OF OWNERSHIP (Check one) <input checked="" type="checkbox"/> A. PRIVATE <input type="checkbox"/> B. FEDERAL <input type="checkbox"/> C. STATE <input type="checkbox"/> D. COUNTY <input type="checkbox"/> E. MUNICIPAL <input type="checkbox"/> F. OTHER: (Specify) <input type="checkbox"/> G. UNKNOWN					
14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply) <input type="checkbox"/> A. RCRA 3001 DATE RECEIVED: / / <input type="checkbox"/> B. UNCONTROLLED WASTE SITE (RCRA 103 e) DATE RECEIVED: / / <input checked="" type="checkbox"/> C. NONE					

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION <input checked="" type="checkbox"/> YES DATE 5-10-74 <input type="checkbox"/> NO 70-76		02 BY (Check all that apply) <input checked="" type="checkbox"/> A. EPA <input type="checkbox"/> B. EPA CONTRACTOR <input checked="" type="checkbox"/> C. STATE <input type="checkbox"/> D. OTHER CONTRACTOR <input type="checkbox"/> E. LOCAL HEALTH OFFICIAL <input type="checkbox"/> F. OTHER: (Specify) CONTRACTOR NAME(S):			
02 SITE STATUS (Check one) <input checked="" type="checkbox"/> A. ACTIVE <input type="checkbox"/> B. INACTIVE <input type="checkbox"/> C. UNKNOWN		03 YEARS OF OPERATION BEGINNING YEAR 1956 ENDING YEAR present <input type="checkbox"/> UNKNOWN			

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Potential contamination of soils, river sediments and ground water with mercury and zinc.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

Chlor-Alkali plant utilized mercury cell process. Mercury laden waste was discharged into the Columbia river until 1970, After this sludges were ponded in unlined pits contaminating soils and potentially groundwater.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents) <input type="checkbox"/> A. HIGH (inspection required promptly) <input type="checkbox"/> B. MEDIUM (inspection required) <input checked="" type="checkbox"/> C. LOW (inspected on time available basis) <input type="checkbox"/> D. NONE (no further action needed, complete current inspection form)			
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VI. INFORMATION AVAILABLE FROM

01 CONTACT Michael Gallagher		02 OF (Agency/Organization) WDOE		03 TELEPHONE NUMBER 206 4596516	
04 PERSON RESPONSIBLE FOR ASSESSMENT Suzanne Milham		05 AGENCY WDOE	06 ORGANIZATION State	07 TELEPHONE NUMBER 206 4596417	08 DATE 01 22 85 MONTH DAY YEAR



IDENTIFICATION

01 STATE WA	02 SITE NUMBER WAD0090414
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IL WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply) <input type="checkbox"/> A. SOLID <input type="checkbox"/> B. POWDER, FINES <input checked="" type="checkbox"/> C. SLUDGE <input type="checkbox"/> D. OTHER _____ (Specify)	02 WASTE QUANTITY AT SITE (Measure of waste quantities must be independent) TONS _____ CUBIC YARDS _____ NO. OF DRUMS _____	03 WASTE CHARACTERISTICS (Check all that apply) <div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> A. TOXIC <input type="checkbox"/> B. CORROSIVE <input type="checkbox"/> C. RADIOACTIVE <input checked="" type="checkbox"/> D. PERSISTENT </div> <div> <input type="checkbox"/> E. SOLUBLE <input type="checkbox"/> F. INFECTIOUS <input type="checkbox"/> G. FLAMMABLE <input type="checkbox"/> H. IGNITABLE </div> <div> <input type="checkbox"/> I. HIGHLY VOLATILE <input type="checkbox"/> J. EXPLOSIVE <input type="checkbox"/> K. REACTIVE <input type="checkbox"/> L. INCOMPATIBLE <input type="checkbox"/> M. NOT APPLICABLE </div> </div>
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UL WASTE TYPE

CATEGORY	SUBSTANCE NAME	Q1 GROSS AMOUNT	Q2 UNIT OF MEASURE	Q3 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	93.5 lbs	mercury/day	lost from plant in river,

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently used CAS numbers)

[illegible]

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VL SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

WDOE SWRO files

EPA water discharge reports 1970



POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I IDENTIFICATION

01 STATE: WA 02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION

03 POPULATION POTENTIALLY AFFECTED: 0

02 ☐ OBSERVED (DATE:)

04 NARRATIVE DESCRIPTION

☒ POTENTIAL ☐ ALLEGED

Mercury contaminated wastes (sludge, liquid) were stored in unlined pits dug in the sand near the Columbia River, rapid migration through the sand is expected to have potentially contaminated ground water. Groundwater flow is towards the Columbia River, depth of groundwater unknown.

01 ☒ B. SURFACE WATER CONTAMINATION

03 POPULATION POTENTIALLY AFFECTED:

02 ☐ OBSERVED (DATE: 56-70)

04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

Mercury contaminated outfall from plant went directly into the Columbia River. Approximately 93.5 lbs/day Hg was lost from the plant. The Columbia is used for fishing and there is a boat launch 1/4 mile downstream from the site.

01 ☒ C. CONTAMINATION OF AIR

03 POPULATION POTENTIALLY AFFECTED: 0

02 ☐ OBSERVED (DATE:)

04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

Emissions from the Weyerhaeuser site include those from the pulp mill located there. The chlor-alkali plant itself doesn't contribute significantly to air contamination.

01 ☒ D. FIRE/EXPLOSIVE CONDITIONS

03 POPULATION POTENTIALLY AFFECTED: 0

02 ☐ OBSERVED (DATE:)

04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

No significant fire hazard or explosion threat is indicated by local fire authorities.

01 ☒ E. DIRECT CONTACT

03 POPULATION POTENTIALLY AFFECTED: 0

02 ☐ OBSERVED (DATE:)

04 NARRATIVE DESCRIPTION

☒ POTENTIAL ☐ ALLEGED

The Weyerhaeuser site is secured by fences, however there is a public boat launch 1/4 mile directly downstream from the site.

01 ☒ F. CONTAMINATION OF SOIL

03 AREA POTENTIALLY AFFECTED: 100 Ac. (ACRES)

02 ☐ OBSERVED (DATE: 70-76)

04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

Hg contamination of medium sandy loam, well draining soils permeability >20"/minute. Contamination from holding pond seepage, contamination of river bottom sand and sediments. The slope gradient from the site is towards the river, groundwater flows towards the river.

01 ☒ G. DRINKING WATER CONTAMINATION

03 POPULATION POTENTIALLY AFFECTED: 0

02 ☐ OBSERVED (DATE:)

04 NARRATIVE DESCRIPTION

☒ POTENTIAL ☐ ALLEGED

The Columbia River channel protects drinking water on the South side of the site. Longview utilizes a municipal water system supplied from a reservoir 3 miles North of the Chlor-Alkali plant.

01 ☒ H. WORKER EXPOSURE/INJURY

03 WORKERS POTENTIALLY AFFECTED: 0

02 ☐ OBSERVED (DATE:)

04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

The Weyerhaeuser site no longer uses the mercury cell process. Present employees would not be exposed to mercury, although the present process utilizes caustics and other potentially hazardous materials regulated by Labor and Industries.

01 ☒ I. POPULATION EXPOSURE/INJURY

03 POPULATION POTENTIALLY AFFECTED: 0

02 ☐ OBSERVED (DATE:)

04 NARRATIVE DESCRIPTION

☒ POTENTIAL ☐ ALLEGED

Any use of the Columbia River for fishing, swimming, etc. could lead to exposure to mercury laden sediments. Fish eaten from this area could have bioaccumulations of mercury and/or zinc.



POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE 02 SITE NUMBER
WA

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☒ J. DAMAGE TO FLORA
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☒ POTENTIAL

☐ ALLEGED

Mercury discharges into the Columbia River may effect or be stored by plants growing in contaminated sediments and animal life.

01 ☒ K. DAMAGE TO FAUNA
04 NARRATIVE DESCRIPTION (Include name(s) of species)

02 ☐ OBSERVED (DATE: _____)

☒ POTENTIAL

☐ ALLEGED

SEE J ABOVE

01 ☐ L. CONTAMINATION OF FOOD CHAIN
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☐ POTENTIAL

☐ ALLEGED

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES
(Spills/runoff/standing liquids/leaking drums)
03 POPULATION POTENTIALLY AFFECTED: _____

02 ☐ OBSERVED (DATE: 1970)

☐ POTENTIAL

☐ ALLEGED

04 NARRATIVE DESCRIPTION

1970 WDOE report: mercury sludges and other wastes stored in unlined pits scooped out of sandy river deposits. Observed seepage into ground.

01 ☒ N. DAMAGE TO OFFSITE PROPERTY
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☒ POTENTIAL

☐ ALLEGED

No record of damage to off-site property, potential exists for offsite contamination of any nearby wells and of river sediments.

01 ☒ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: 56-70)

☐ POTENTIAL

☐ ALLEGED

Cooling water, condensate contaminated with mercury was released into sewer system. All mercury contaminated waste streams were sewered prior to 1970.

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: 56-70)

☐ POTENTIAL

☐ ALLEGED

There are many documented violations of water discharge standards of excess mercury and zinc (SWRO, DOE inspection reports). Until 1970 there was no regulation of mercury or zinc usage or disposal at this site.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: 30,000

IV. COMMENTS

Although a cleanup of gross mercury contamination of holding ponds was completed in 1975-76, previous contamination of soils, groundwater, and Columbia River bottom sediments over a 20 yr. period warrant further investigation.

V. SOURCES OF INFORMATION (Cite specific references, e. g., state files, sample analyses, reports)

NEDES: WASH.000012-4

WDOE SWRO Files

EPA files need to be looked at

003767-2

WDOE Industrial Section Files

FORM 4

GENERATOR ANNUAL DANGEROUS WASTE REPORT FOR 1983

11. GENERATOR EPA/STATE IDENTIFICATION NUMBER		FOR OFFICIAL USE ONLY (ITEMS I. AND II.)	I. DATE RECEIVED (Month, Day, Year)		— — 1 9	
WA 0009041450			II. RECEIVED BY			
12. TSD FACILITY'S EPA/STATE IDENTIFICATION NUMBER		14. TSD FACILITY ADDRESS (STREET OR P.O. BOX, CITY, STATE & ZIP CODE)				
13. TSD FACILITY NAME						

15. TRANSPORTER(S) USED (Include EPA/State I.D. number, name, and address)

16. WASTE IDENTIFICATION

LINE	Physical State S=Solid L=Liquid G=Sludge	Chemical Nature O=Organic I=Inorganic	A. DESCRIPTION OF WASTE	B. DANGEROUS WASTE NUMBER (see instructions)		C. Waste Designation DW or EHW	D. AMOUNT OF WASTE				E. WEIGHT CODE
				WT	02						
1	G	O	PAINT SLUDGE - Acrylic Paint waste	WT	02	DW				450	P
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

17. COMMENTS (ENTER INFORMATION BY SECTION AND/OR LINE NUMBER—SEE INSTRUCTIONS)

PHOTOGRAPHS



All photographs were taken during the 9/30/86 SI by Michael J. Spencer, using a Canon Sureshot 38 mm f/2.8 Autofocus camera.

West site: looking to the east. Sampling site 2 was approx. 25 feet to the north of the nearer telephone pole, location of site 3 was 50 feet further to the north.



West site: looking to the west. Sampling site **2** was approx. 25 feet to the north of the telephone pole (on left) and site 3 was 50 feet further to the north. Location of site **1** was near (south) base of the pile of rubble (to the right, above).



East site (immediately east of cell bldg.)
 Above: Towards (south) Columbia River, the
 approx. location of sampling site 5 in the
 center of photo.
 Below: Looking to north from approx. loca-
 tion of sampling site 4.

